

SARC Foxhunt-May 19

*The*

# ***Communicator***

A Publication Of The Surrey Amateur Radio Club

HAM RADIO



IT'S A CONTACT SPORT

May 2018

**SARC**



May 2018



## CONTACTS

(778) 683-4662

General Correspondence  
12144 - 57A Avenue  
Surrey, BC V3X 2S3  
[SARC at ve7sar.net](http://SARC.at.ve7sar.net)

Operations & Training Centre  
14265 - 57 Avenue

## COMMUNICATOR & BLOG EDITOR

John Schouten VE7TI

## WEBMASTER

Jeremy Morse VE7TMY

The **Communicator** is a publication of the Surrey Amateur Radio Club. It appears monthly, except July and August, for area Amateur Radio operators, to enhance the exchange of information and to promote local ham radio activity.

To subscribe, unsubscribe or change your address for e-mail delivery of this newsletter, notify [communicator @ ve7sar.net](mailto:communicator@ve7sar.net)

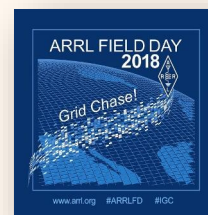
Regular readers who are not SARC members are invited to contribute a \$5 annual [donation](#) towards our Field Day fund.

SARC maintains a website at [www.ve7sar.net](http://www.ve7sar.net) and a Digital Communicator at [ve7sar.blogspot.ca](http://ve7sar.blogspot.ca) that includes recent news, past issues of The Communicator, club history, photos, videos and other information.

## IN THIS ISSUE

click on the page number below

	QRM	3
The Rest Of The Story—Reginald Fessenden		4
Back To Basics—Yagi Antennas		10
What's Happening This Month In Ham?		12
News You Can Lose—Ham Humour		13
Club News—SARC		14
Radio Direction Finding		16
Club Station/OTC News		22
Radio Active		24
Field Day 2018		25
Emergency Comms—SEPAR Report		26
News From Lower Mainland Clubs		28
RAC News		32
Tech Topics: A Simple Digital S-meter		36
The State Of The Hobby		39
A Low Cost, High Amperage Power Supply		40
Ham News		42
QRT		44



## On The May Cover...

*This issue of The Communicator focusses on Radio Direction Finding (RDF), more commonly known as 'Fox Hunting'. But there is a lot more, including two interesting projects from Daniel Romila, an article on a CW N1MM bug that caused a lot of head scratching at our club station, plus all of our monthly columnists. Enjoy this issue and we hope to see some of you at our Fox Hunt.*





# QRM

---.---.---.---

...from the Editor's Shack

*Do you have a photo or bit of club news to share?  
An Interesting link?*

*Something to sell or something you are looking for?  
eMail it to [communicator @ ve7sar.net](mailto:communicator@ve7sar.net) for inclusion in this publication.*

Here we are in May already and well on our way to three major events in our local Amateur Radio calendar.

The first is our SARC Foxhunt on Saturday, May 19th. For any new hams, Foxhunting is an Amateur Radio 'sport' that goes by several names including Amateur Radio Direction Finding (ARDF), T-hunting and bunny hunting. It is an activity wherein participants use radio direction finding techniques to locate one or more radio transmitters hidden within a designated search area.

You do not need an Amateur Radio license to participate as it uses your receiver only, it can even be done by a scanner enthusiast. Directional antennas are popular choices for transmitter hunting. A directional antenna is more sensitive to received signals in some directions than others. When a directional antenna is rotated, a received signal will either increase or decrease in signal strength, information from which a skilled hunter can determine the likely direction to the transmitter.

Aside from radio skills, this is also a healthy outdoor activity, providing an opportunity for either a brisk walk or leisurely stroll in the South Surrey park setting. Come for the social... a nice barbecue follows to wrap up the event.

Then on Saturday, June 9th we participate in [Surrey Doors Open](#). This is a one day event for organizations to invite community members to "discover the story behind every door". This free event offers fun activities for all ages, behind-the-scenes guided tours, entertainment, hop-on-hop-off transportation and more! Almost 5,000 visitors attended last year. Together with SEPAR, we will open the doors of the OTC between 11am and 4pm with a variety of displays and activities.

To round out the month we have the Field Day weekend on June 23-24 with setup on Friday, June 22. Every June, more than 40,000 hams throughout North America set up temporary transmitting stations in public places to demonstrate ham radio's science, skill and service to our communities and our nation. It highlights emergency preparedness and combines public service, community outreach, and technical skills all in a single event. Field Day has been an annual event since 1933, and remains the most popular event in ham radio. Our team has done very well in the past—we hope to repeat our successes.

Please mark these dates and participate if you can.

~ John VE7TI  
Communicator Editor

## On the Web

[ve7sar.net](http://ve7sar.net)

Between newsletters, watch your e-mail for news, announcements of Amateur Radio events, monthly meetings and training opportunities.

Click the links below to follow our presence on the web:

**SARC Blog**

[ve7sar.blogspot.ca](http://ve7sar.blogspot.ca)

**Twitter**

[@ve7sar](https://twitter.com/ve7sar)

**FaceBook**

[SurreyAmateurRadio](#)

**Our YouTube Channel**

[SurreyARC](#)

**SARC Photo Albums**

**Web Albums**

or

[tinyurl.com/SARCphoto](http://tinyurl.com/SARCphoto)

*Being ignorant is not so much a shame as being unwilling to learn—Benjamin Franklin*



May 2018



## The Rest Of The Story...

Reginald Fessenden

*Canadian Inventor and Early Broadcaster*



Reginald Aubrey Fessenden

### Early Years

Reginald Aubrey Fessenden was born on October 6, 1866 in East-Bolton, Quebec. His classical education provided him with only a limited amount of scientific and technical training. Interested in increasing his skills in the electrical field, he moved to New York City in 1886, with hopes of gaining employment with the famous inventor, Thomas Edison. However, his initial attempts were rebuffed; in his first application Fessenden wrote, "Do not know anything about electricity, but can learn pretty quick," to which Edison replied, "Have enough men now who do not know about electricity." However, Fessenden

persevered, and before the end of the year was hired for a semi-skilled position as an assistant tester for the Edison Machine Works, which was laying underground electrical mains in New York City. He quickly proved his worth, and received a series of promotions, with increasing responsibility for the project. In late 1886, Fessenden began working directly for Edison at the inventor's new laboratory in West Orange, New Jersey as a junior technician. He participated in a broad range of projects, which included work in solving problems in chemistry, metallurgy, and electricity. However, in 1890, facing financial problems, Edison was forced to lay off most of the laboratory employees, including Fessenden. (Fessenden remained an admirer of Edison his entire life, and in 1925 stated that "there is only one figure in history which stands in the same rank as him as an inventor, i. e. Archimedes".)

Taking advantage of his recent practical experience, Fessenden was able to find positions with a series of manufacturing companies. In 1892, he received an appointment as professor for the newly formed Electrical Engineering department at Purdue University in West Lafayette, Indiana; while there he helped the Westinghouse Corporation install the lighting for the 1893 Chicago World Columbian Exposition. Later that year, George Westinghouse personally recruited Fessenden for the newly created position of chair of the Electrical Engineering department at the Western University of Pennsylvania in Pittsburgh.

### Radio work

In the late 1890s, reports began to appear about the success Guglielmo Marconi was having in developing a practical system of transmitting and receiving radio signals, then commonly known as "wireless telegraphy". Fessenden began limited radio experimentation, and soon came to the conclusion that he could develop a far more efficient system than the spark-gap transmitter and coherer-receiver combination which had been created by Oliver Lodge and Marconi. By 1899 he was able to send radiotelegraph messages between Pittsburgh and Allegheny City, using a receiver of his own design.

### Weather Bureau contract

In 1900 Fessenden left Pittsburgh to work for the United States Weather Bureau, with the objective of proving the practicality of using a network of coastal radio stations to transmit weather information wirelessly, thereby avoiding the expense of the existing telegraph lines. The provisions of his contract called for him to be paid \$3,000 per year, and provided with work space, assistance, and housing. The agreement gave the Weather Bureau access to any devices

Fessenden developed, but he would retain ownership of his inventions. Fessenden quickly made major advances, especially in receiver design, as he worked to develop audio reception of signals. His initial success came from the invention of a barretter detector, which was followed by an electrolytic detector, which consisted of a fine wire dipped in nitric acid, and for the next few years this latter device would set the standard for sensitivity in radio reception.

As his work progressed, Fessenden also developed the heterodyne principle, which, to aid reception, used two closely spaced radio signals to produce an audible tone that made Morse code transmissions much easier to hear. However, heterodyne reception would not become practical for a decade after it was invented, because it required a method for producing a stable local signal, which would not become available until the development of the oscillating vacuum-tube.

Fessenden's initial Weather Bureau work took place at Cobb Island, Maryland, located in the Potomac River about 80 kilometers (50 mi) downstream from Washington, DC. As the experimentation expanded, additional stations were built along the Atlantic Coast in North Carolina and Virginia. However, in the midst of promising advances, Fessenden became embroiled in disputes with his sponsor. In particular, he charged that Bureau Chief Willis Moore had attempted to gain a half-share of the patents. Fessenden refused to sign over the rights, and his work for the Weather Bureau ended in August 1902.

### **National Electric Signaling Company**

In November 1902, two wealthy Pittsburgh, Pennsylvania businessmen, Hay Walker, Jr., and Thomas H. Given, financed the formation of the National Electric Signaling Company (NESCO) to support Fessenden's research. Initially the new company was based in Washington, D.C., where a station was constructed for experimental and demonstration purposes. Two additional demonstration stations were constructed at Collinswood, New Jersey (near Philadelphia) and Jersey City, New Jersey (near New York City). Efforts to sell equipment to the U.S. and other governments, as well as private companies, met with little success. An ongoing area of conflict, especially with the U.S. Navy, were the high prices Fessenden tried to charge. The Navy in particular felt Fessenden's quotes were too far

above the device's manufacturing costs to be considered reasonable, and contracted with other companies to build equipment that used Fessenden designs. This led to bad feelings and a series of patent infringement lawsuits. An alternate plan to sell the company as a whole was unsuccessful in finding a buyer.

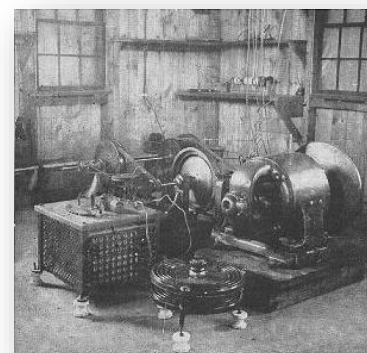
Eventually a radical change in company orientation took place. In 1904 it was decided to compete with the existing ocean cables, by setting up a transatlantic radiotelegraph link. The headquarters for company operations was moved to Brant Rock, Massachusetts, which was to be the western terminal for the proposed new service.

### **Rotary-spark transmitter and the first two-way transatlantic transmission**

The plan was to conduct the transatlantic service using Fessenden designed rotary spark-gap transmitters. A 420 foot (128 meter) guyed antenna was constructed at Brant Rock, with a similar tower erected at Machrihanish in western Scotland. In January 1906, these stations made the first successful two-way transmission across the Atlantic, exchanging Morse code messages. (Marconi had only achieved one-way transmissions at this time.) However, the system was unable to reliably bridge this distance when the sun was up, or during the summer months when interference levels were higher, so work was suspended until later in the year. Then, on December 6, 1906, the Machrihanish radio tower collapsed in a gale, abruptly ending the transatlantic project before it could begin commercial service.

In a letter published in the January 19, 1907 issue of Scientific American, Fessenden discounted the effect of the tower collapse, stating that "The working up to the date of the accident was, however, so successful that the directors of the National Electric Signaling Company have decided that it is unnecessary to carry on the experimental developments any further, and specifications are being drawn up for the erection of five stations for doing transatlantic and other cable work, and a commercial permit is being applied for in England." However, the tower collapse did in fact mark the end of NESCO's transatlantic efforts.

Although the tower was demolished in 1917, the insulated base on which it stood survives.



May 2018



*Fessenden had a very early interest in the possibility of making audio radio transmissions...*

The layers of concrete were originally separated by ceramic insulators.

### Audio transmissions

Fessenden had a very early interest in the possibility of making audio radio transmissions, in contrast to the early spark-gap transmissions that could only transmit Morse code messages. As early as 1891, he had investigated sending alternating currents of varying frequencies along telegraph lines, in order to create a multiplex telegraph system. He would later apply the knowledge gained about tuning and resonance from his alternating current electrical work to the higher frequency currents used in radio, in order to develop the concept of continuous-wave radio signals.

Fessenden's basic approach was disclosed in U.S. Patent 706,737, which he applied for on May 29, 1901, and was issued the next year. It called for the use of a high-speed alternator (referred to as "an alternating-current dynamo") that generated "pure sine waves" and produced "a continuous train of radiant waves of substantially uniform strength", or, in modern terminology, a continuous-wave (CW) transmitter. The idea of using continuous-wave radio signals was in direct conflict with the current orthodoxy that the abrupt "whiplash" effect produced by large electrical sparks was needed in order to create adequately strong signals. John Ambrose Fleming, a Marconi associate, was particularly dismissive in his book *The Principles of Electric Wave Telegraphy*, a detailed review of the state of the art as he saw it that was published in 1906. Reviewing Fessenden's patent, he wrote that "The creation of an electric wave seems to involve

a certain suddenness in the beginning of the oscillations, and an alternator giving a simple sine-curve would not be likely to produce the required effect..." (In view of Fessenden's ultimate success, this statement disappeared from the book's 1916 edition.) Fessenden's next step, taken from standard wire-telephone practice, was to insert a simple carbon microphone into the transmission line, which was used to modulate the carrier wave signal for audio transmissions, or, again using

modern terms, used to produce amplitude modulated (AM) radio signals.

Fessenden began his research on audio transmissions while still on Cobb Island. Because he did not yet have a continuous-wave transmitter, initially he worked with an experimental "high-frequency spark" transmitter, taking advantage of the fact that the higher the spark rate, the closer a spark-gap transmission comes to producing continuous waves. He later reported that, in the fall of 1900, he successfully transmitted speech over a distance of about 1.6 kilometers (one mile), which appears to have been the first successful audio transmission using radio signals. However, at this time the sound was far too distorted to be commercially practical, although as a test this did show that with further refinements it would become possible to effectively transmit sounds by radio.

For a time Fessenden continued working with more sophisticated high-frequency spark transmitters, including versions that used compressed air, which began to take on some of the characteristics of arc-transmitters patented by Valdemar Poulsen. Fessenden unsuccessfully attempted to sell this form of radiotelephone, later noting: "In 1904, with a 20,000 frequency spark and compressed nitrogen gap, such good results were obtained that a demonstration was given to a number of electrical engineers, who signed affidavits that they considered the articulation as commercially good over twenty-five miles, and the sets were advertised for sale..." (In a 1908 review, he conceded that with this approach "The transmission was, however, still not absolutely perfect.")

### Alternator-transmitter

Fessenden's ultimate plan for an audio-capable transmitter was to take a basic electrical alternator, which normally rotated at speeds that produced alternating current of at most a few hundred cycles-per-second (hz), and greatly increase its rotational speed, in order to create electrical currents of tens-of-thousands of cycles-per-second (kHz), thus producing a steady continuous-wave transmission when connected to an aerial. However, it would take many years of





expensive development before even a prototype alternator-transmitter would be ready, and a few years beyond that for high-power versions to become available. One concern was whether at these high speeds the alternator might disintegrate due to the high rotation speed tearing it apart. Because of this, as a precaution, while the alternator was being initially developed it was "placed in a pit surrounded by sandbags".

Fessenden contracted with General Electric (GE) to help design and produce a series of high-frequency alternator-transmitters. In 1903, Charles Proteus Steinmetz of GE delivered a 10 kHz version which proved of limited use and could not be directly used as a radio transmitter. Fessenden's request for a faster, more powerful unit was assigned to Ernst F. W. Alexanderson, who in August 1906 delivered an improved model which operated at a transmitting frequency of approximately 50 kHz, although with far less power than Fessenden's rotary-spark transmitters.

The alternator-transmitter achieved the goal of transmitting quality audio signals, but the lack of any way to amplify the signals meant they were somewhat weak. On December 21, 1906, Fessenden made an extensive demonstration of the new alternator-transmitter at Brant Rock, showing its utility for point-to-point wireless telephony, including inter-connecting his stations to the wire telephone network. As part of the demonstration, speech was transmitted 18 kilometers (11 miles) to a listening site at Plymouth, Massachusetts. A detailed review of this demonstration appeared in *The American Telephone Journal* and a summary by Fessenden appeared in *Scientific American*. A portion of a report produced by Greenleaf W. Pickard of the Telephone Company's Boston office, which includes additional information on some still existing defects, appeared in Ernst Ruhmer's *Wireless Telephony in Theory and Practice*.

Although primarily designed for transmissions spanning a few kilometers, on a couple of occasions the test Brant

Rock audio transmissions were apparently overheard by NESCO employee James C. Armor across the Atlantic at the Machrihanish site.

### First entertainment radio broadcast

Until the early-1930s, it was generally accepted that Lee de Forest, who conducted a series of test broadcasts beginning in 1907, and who was widely quoted promoting the potential of organized radio broadcasting, was the first person to transmit music and entertainment by radio. De Forest's first entertainment broadcast occurred in February 1907, when he transmitted electronic telharmonium music from his laboratory station in New York City. This was followed by tests that included, in the fall, Eugenia Farrar singing "I Love You Truly". (Beginning in 1904, the U.S. Navy had broadcast daily time signals and weather reports, but these employed spark transmitters, transmitting in Morse code).

In 1928, as part of a lecture reviewing "The Early History of Radio in the United States", H. P. Davis, commenting on entertainment offerings, asserted that "Reginald Fessenden, probably the first to attempt this, broadcast a program Christmas Eve 1906", but didn't provide any additional details, and his comment was little noticed at the time. In his account, Fessenden reported that on the evening of December 24, 1906 (Christmas Eve), he had made the first of two radio broadcasts of music and entertainment to a general audience, using the alternator-transmitter at Brant Rock. Fessenden remembered producing a short program that included a phonograph record of *Ombra mai fu* (Largo) by George Frideric Handel, followed by Fessenden playing Adolphe Adam's carol *O Holy Night* on the violin and singing *Adore and be Still* by Gounod, and closing with a biblical passage: "Glory to God in the highest and on earth peace to men of good will" (Luke 2:14). He also stated that a second short program was broadcast on December 31 (New Year's Eve). The intended audience for both of these transmissions was primarily shipboard radio operators along the Atlantic seaboard. Fessenden claimed that

”

*Reginald Fessenden,  
probably the first to  
attempt this,  
broadcast a program  
Christmas Eve 1906*

May 2018

the two programs had been widely publicized in advance, and the Christmas Eve broadcast had been heard "as far down" as Norfolk, Virginia, while the New Year Eve's broadcast had reached listeners in the West Indies. Fessenden's claim for the first radio broadcast in 1906 is recognized as an IEEE Milestone.

The American Telephone Journal account of the December 21 alternator-transmitter demonstration included the statement that "It is admirably adapted to the transmission of news, music, etc. as, owing to the fact that no wires are needed, simultaneous transmission to many subscribers can be effected as easily as to a few", echoing the words of a handout distributed to the demonstration witnesses, which stated "[Radio] Telephony is admirably adapted for transmitting news, stock quotations, music, race reports, etc. simultaneously over a city, on account of the fact that no wires are needed and a single apparatus can distribute to ten thousand subscribers as easily as to a few. It is proposed to erect stations for this purpose in the large cities here and abroad." However, other than the two reported holiday transmissions, Fessenden does not appear to have conducted any other radio broadcasts, or to have even given additional thought about the potential of a regular broadcast service. In a 1908 comprehensive review of "Wireless Telephony", he included a section titled "possibilities" that listed promising radio telephone uses. Neither the main article, nor this list, makes any reference to broadcasting, instead only noting conventional applications of point-to-point communication, enumerated as "local exchanges", "long-distance lines", "transmarine transmission", "wireless telephony from ship to ship", and "wireless telephone from ship to local exchange".

### Continuing work and dismissal from NESCO

The technical achievements made by Fessenden were not matched by financial success. Walker and Given continued to hope to sell NESCO to a larger company such as the American Telephone & Telegraph Company (AT&T). After the December 21, 1906 demonstrations, AT&T was said to be planning to acquire NESCO, but financial setbacks caused the telephone company to reconsider, and NESCO was unable to find another buyer. There were growing strains between Fessenden and the company owners, and Fessenden's formation of the Fessenden Wireless Company of Canada in Montreal in 1906 may have led to suspicion that he was trying to freeze Walker and Given out of a potentially lucrative competing transatlantic service. The final break occurred in January 1911, when Fessenden was formally dismissed from NESCO. This resulted in his bringing suit against NESCO, for breach of contract. Fessenden won

the initial court trial and was awarded damages; however, NESCO prevailed on appeal. To conserve assets, NESCO went into receivership in 1912, and Samuel Kintner was appointed general manager of the company. The legal stalemate would continue for over 15 years. In 1917, NESCO finally emerged from receivership, and was soon renamed the International Radio Telegraph Company. The company limped along for a few years, until it was sold to the Westinghouse Electric & Manufacturing Company in 1920, and the next year its assets, including numerous important Fessenden patents, were sold to the Radio Corporation of America (RCA), which also inherited the longstanding Fessenden legal proceedings. Finally, on March 31, 1928, Fessenden settled his outstanding lawsuits with RCA, receiving a significant cash settlement.

### Later years

After Fessenden left NESCO, Ernst Alexanderson continued to work on alternator-transmitter development at General Electric, mostly for long range radiotelegraph use. He eventually developed the high-powered Alexanderson alternator, capable of transmitting across the Atlantic, and by 1916 the Fessenden-Alexanderson alternator was more reliable for transoceanic communication than the spark transmitters which were originally used to provide this service. Also, after 1920 radio broadcasting became widespread, and although the stations used vacuum-tube transmitters rather than alternator-transmitters (which vacuum-tubes made obsolete), they employed the same AM signals that Fessenden had introduced in 1906.

Although Fessenden ceased radio research after his dismissal from NESCO in 1911, he continued to work in other fields. As early as 1904 he had helped engineer the Niagara Falls power plant for the newly formed Hydro-Electric Power Commission of Ontario. However, his most extensive work was in marine communication, in conjunction with the Submarine Signal Company. While there, he helped develop a type of sonar system, the Fessenden oscillator, for submarines to signal each other, as well as a method for locating icebergs, to help avoid another disaster like the one that sank Titanic. In these efforts, akin to his replacing spark-gap with continuous-wave radio transmitters, he had the company replace devices that rang bells with ones that transmitted a steady tone.

At the outbreak of World War I, Fessenden volunteered his services to the Canadian government and was sent to London where he developed a device to detect enemy artillery and another to locate enemy submarines. Other efforts included a version of microfilm, that helped him



to keep a compact record of his inventions, projects and patents. He also patented the basic ideas leading to reflection seismology, a technique important for its use in exploring for petroleum, and received patents for diverse subjects that included tracer bullets, paging, television apparatus, and a turbo electric drive for ships. An inveterate tinkerer, Fessenden eventually became the holder of more than 500 patents.

In 1925, Radio News, saluting Fessenden as "one of the greatest American radio inventors", began a monthly autobiographical series titled "The Inventions of Reginald A. Fessenden", with the intention of publishing the completed installments as a book. However, instead of reviewing his radio work, Fessenden immediately went on a series of tangents, including discussions of which races he believed were the most capable of producing inventions, and the proper approach that government institutions should be taking in order to support inventors. (At the close of the seventh installment, Radio News included a disclaimer that it was "not responsible for any opinions expressed in Dr. Fessenden's article".) After eleven installments Fessenden had only covered his life up to 1893, having discussed virtually nothing about radio, and the series was quietly terminated at this point.

### Awards

In 1921, the Institute of Radio Engineers presented Fessenden with its IRE Medal of Honor. The medallion was gold plated, and somehow Fessenden became convinced that earlier awards had been solid gold, so he angrily returned it. Only after Greenleaf W. Pickard investigated the matter and determined that the prior medals were also plated was Fessenden willing to relent. The next year Philadelphia's Board of Directors of City Trusts awarded Fessenden a John Scott Medal, which included a cash prize of \$800, for "his invention of a reception scheme for continuous wave telegraphy and telephony", and recognized him as "One whose labors had been of great benefit." There was suspicion by Fessenden that these two awards had not been made in sincerity but in order to placate him. In his wife's biography, referring to the IRE medal, she quoted the proverb "beware of Greeks bearing gifts". The Scott Medal came under additional suspicion because it had been awarded at

the suggestion of Westinghouse engineers, who were working for a company that had had financial disputes with Fessenden. In Helen Fessenden's opinion, "The Medal cost [Westinghouse] nothing and was a good 'sop to Cereberus'", and overall compared the medals to "small change for tips in the pockets of Big Business". In 1929 Fessenden was awarded Scientific American's Safety at Sea Gold Medal, in recognition of his invention "of the Fathometer and other safety instruments for safety at sea".

### Death and legacy

After settling his lawsuit with RCA, Fessenden purchased a small estate called "Wistowe" in Bermuda. He died there on July 22, 1932 and was interred in the cemetery of St. Mark's Church on the island. On the occasion of his death, an editorial in the New York Herald Tribune, "Fessenden Against the World", said:

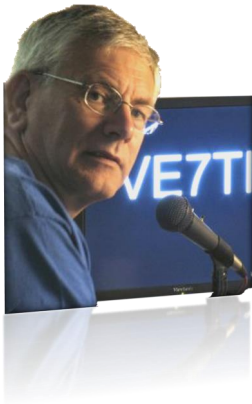
It sometimes happens, even in science, that one man can be right against the world. Professor Fessenden was that man. It is ironic that among the hundreds of thousands of young radio engineers whose commonplaces of theory rest on what Professor Fessenden fought for bitterly and alone only a handful realize that the battle ever happened... It was he who insisted, against the stormy protests of every recognized authority, that what we now call radio was worked by "continuous waves" of the kind discovered by Hertz, sent through the ether by the transmitting station as light waves are sent out by a flame. Marconi and others insisted, instead, that what was happening was the so-called "whiplash effect"... It is probably not too much to say that the progress of radio was retarded a decade by this error... The whiplash theory faded gradually out of men's minds and was replaced by the continuous wave one with all too little credit to the man who had been right. Hmmm, imagine, a Canadian as the true father of today's radio. And that's the rest of the story.

~

*Reginald Fessenden demonstrated that sound — not simply Morse code — could be transmitted over radio, leading the way for radio broadcasting.*



May 2018



## Back to Basics

John Schouten VE7TI

### *From The Basic Question Bank*

**B-006-011-001** How many directly driven elements do most Yagi antennas have?

- A. One
- B. Two
- C. Three
- D. None

A Yagi-Uda antenna, commonly known as a Yagi antenna, is a directional antenna consisting of multiple parallel elements in a line, usually half-wave dipoles made of metal rods. Yagi-Uda antennas consist of a single driven element connected to the transmitter or receiver with a transmission line, and additional "parasitic elements" which are not connected to the transmitter or receiver: a so-called reflector and one or more directors. It was invented in 1926 by Shintaro Uda of Tohoku Imperial University, Japan, and (with a lesser role played by his colleague) Hidetsugu Yagi.

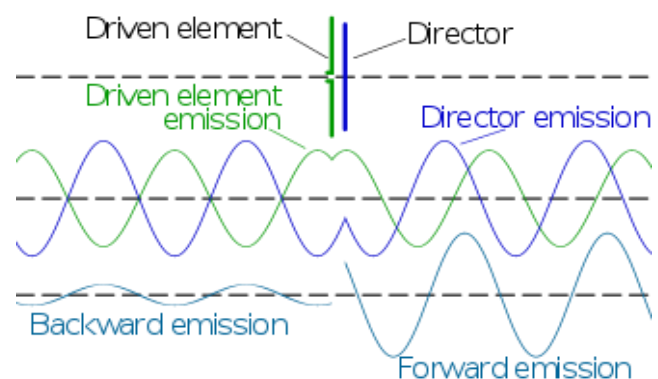
The reflector element is slightly longer than the driven dipole, whereas the directors are a little shorter. This design achieves a very substantial increase in the antenna's directionality and gain compared to a simple dipole.

Also called a "beam antenna", or "parasitic array", the Yagi is very widely used as a high-gain antenna on the HF, VHF and UHF bands. It has moderate to high gain which depends on the number of elements used, typically limited to about 20 dBi, linear polarization, unidirectional (end-fire) beam pattern with high front-to-back ratio of up to 20 db. and is lightweight, inexpensive and simple to construct. The bandwidth of a Yagi antenna, the frequency range over which it has high gain, is narrow, a few percent of the center frequency, and decreases with increasing gain, so it is often used in fixed-frequency applications. The largest and best-known use is as rooftop terrestrial television antennas, but it is also used

for point-to-point fixed communication links, in radar antennas, and for long distance shortwave communication by shortwave broadcasting stations and radio amateurs.

Consider a Yagi-Uda consisting of a reflector, driven element and a single director as shown here. The driven element is typically a  $\lambda/2$  dipole or folded dipole and is the only member of the structure that is directly excited (electrically connected to the feedline). All the other elements are considered parasitic. That is, they reradiate power which they receive from the driven element (they also interact with each other).

The Yagi-Uda antenna consists of a number of parallel thin rod elements in a line, usually half-wave long, typically supported on a perpendicular crossbar or "boom" along their centers. There is a single driven element driven in the center (consisting of two rods each connected to one side of the transmission line), and a variable number of parasitic elements, a single reflector on one side and optionally one or more directors on the other side. The parasitic elements are not electrically connected to the transmitter or receiver, and serve as passive radiators, reradiating the



*Illustration of forward gain of a two element Yagi-Uda array using only a driven element (left) and a director (right). The wave (green) from the driven element excites a current in the passive director which reradiates a wave (blue) having a particular phase shift (see explanation in text). The addition of these waves (bottom) is increased in the forward direction, but leads to cancellation in the reverse direction.*



radio waves to modify the radiation pattern. Typical spacings between elements vary from about  $1/10$  to  $1/4$  of a wavelength, depending on the specific design. The directors are slightly shorter than the driven element, while the reflector(s) are slightly longer. The radiation pattern is unidirectional, with the main lobe along the axis perpendicular to the elements in the plane of the elements, off the end with the directors.

Conveniently, the dipole parasitic elements have a node (point of zero RF voltage) at their centre, so they can be attached to a conductive metal support at that point without need of insulation, without disturbing their electrical operation. They are usually bolted or welded to the antenna's central support boom. The driven element is fed at centre so its two halves must be insulated where the boom supports them.

The gain increases with the number of parasitic elements used. Only one reflector is used since the improvement of gain with additional reflectors is negligible, but Yagis have been built with up to 30-40 directors.

The bandwidth of the antenna is the frequency range between the frequencies at which the gain drops 3 dB (one-half the power) below its maximum. The Yagi-Uda array in its basic form has very narrow bandwidth, 2-3 percent of the centre frequency. There is a tradeoff between gain and bandwidth, with the bandwidth narrowing as more elements are used. For applications that require wider bandwidths, such as terrestrial television, Yagi-Uda antennas commonly feature trigonal reflectors, and larger diameter conductors, in order to cover the relevant portions of the VHF and UHF bands. Wider bandwidth can also be achieved by the use of "traps", as described below.

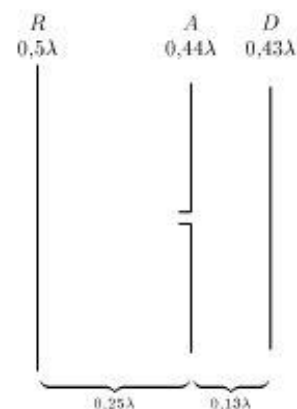
Yagi-Uda antennas used for amateur radio are sometimes designed to operate on multiple bands. These elaborate designs create electrical breaks along each element (both

sides) at which point a parallel LC (inductor and capacitor) circuit is inserted. This so-called trap has the effect of truncating the element at the higher frequency band, making it approximately a half wavelength in length. At the lower frequency, the entire element (including the remaining inductance due to the trap) is close to half-wave resonance, implementing a different Yagi-Uda antenna. Using a second set of traps, a "triband" antenna can be resonant at three different bands. Given the associated costs of erecting an antenna and rotor system above a tower, the combination of antennas for three amateur bands in one unit is a very practical solution. The use of traps is not without disadvantages, however, as they reduce the bandwidth of the antenna on the individual bands and reduce the antenna's electrical efficiency and subject the antenna to additional mechanical considerations (wind loading, water and insect ingress).

We have published several easy 'how-to' Yagi construction projects in the Communicator including the February 2018 issue. Given the foregoing, the correct answer to our question therefore is:

**A. One**

~ John VE7TI



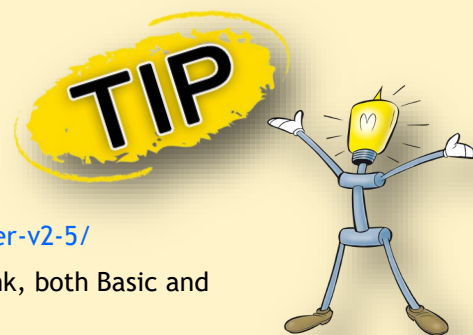
*Yagi-Uda antenna with a reflector (left), half-wave driven element (centre), and director (right). Exact spacings and element lengths vary somewhat according to specific designs.*

## Study Links

Whether you are new to the hobby or brushing up on skills, you should find these study links helpful:

1. RIC-7 is the entire up-to-date Industry Canada (IC) Basic Question Bank.  
<http://tinyurl.com/CanadaBasicQB>
2. There is a RIC-7 that has some explanations along with the questions.  
[RIC-7 2014rev08.05 with explanations.](http://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html)
3. The Amateur Radio Exam Generator is at:  
[https://www.ic.gc.ca/eic/site/025.nsf/eng/h\\_00040.html](https://www.ic.gc.ca/eic/site/025.nsf/eng/h_00040.html)
4. The ExHaminer Study software for Windows is at: <https://wp.rac.ca/exhaminer-v2-5/>
5. The Ham Study website has a flash card approach to learning the Question Bank, both Basic and Advanced. It is at: <https://hamstudy.org>

Contact SARC if you wish to write the Basic or Advanced Exam. If you pass we'll even give you a year's free membership!





May 2018

# May 2018

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 1930 SEPAR Net 2000 SARC Net	2	3	4	5 08-1000 Club Social: Kalmar Family Restaurant King George Blvd & 81st Avenue  CONTEST: Indiana, Delaware and New England QSO Party (all modes)
6 CONTEST: Indiana, Delaware and New England QSO Party (all modes)  Maple Ridge ARC Swap Meet  NSARC Fox Hunt	7	8 1930 SEPAR Net 2000 SARC Net	9 1900 SARC Monthly General Meeting	10	11	12 08-1000 Club Social: Kalmar Family Restaurant  CONTEST: CQ-M DX Contest (CW, SSB)  Stanwood/Camano (WA) Swap Meet
13 Mother's Day  CONTEST: CONTEST: CQ-M DX Contest (CW, SSB)	14	15 1930 SEPAR Net 2000 SARC Net	16	17	18	19 08-1000 Club Social: Kalmar Family Restaurant  CONTEST: EU PSK DX Contest  SARC FoxHunt 10AM (see Page 19)
20 CONTEST: EU PSK DX Contest	21 Victoria Day	22 1930 SEPAR Net 2000 SARC Net	23	24	25	26 08-1000 Club Social: Kalmar Family Restaurant  CONTEST: CQ WW WPX (CW) Contest  Hyack Parade—New West
27 CONTEST: CQ WW WPX (CW) Contest  BCARCC AGM	28	29	30 SARC Exec Meeting	31	<div> <p>For details on all SARC events, go to <a href="http://ve7sar.net">ve7sar.net</a></p> <p>For details on all SEPARS events, go to <a href="http://separ.shutterfly.com/calendar">separ.shutterfly.com/calendar</a></p> </div>	



## Page 13—News You Can Lose

The Lighter Side of Amateur Radio

### *Ham Dismantles Home To Stop Rampant RFI*

By K5PO, on the scene

**SPRINGDALE, Ark.** — Springdale resident Kelvin Trotman has a problem with noise, but not the typical kind found in many neighborhoods. Kelvin can't hear a neighbor practicing the drums during the football game, and instead of loud, drunken parties until 2 a.m., his neighbors are quiet and respectful—yet Kelvin's home is assaulted by noise.

Kelvin, an amateur radio operator, has a house literally bathed in radio frequency-based noise. Most people would never even notice this kind of noise in their home, but as a radio aficionado, it's simply devastating.

In the amateur radio world, this noise is called RFI, or radio frequency interference. As it turns out, the myriad of electronic and powered devices that litter the modern home, also have the bad habit of spewing noisy RFI that can be heard mostly on radio equipment.

"The noise first started when I installed a new "off center fed" antenna suggested to me by Andre Holzmen. He really liked the multi-band performance and simplicity of the OCF dipole so I figured 'Why not?'... Well, he is an idiot. And it brought me nothing but trouble!" said Trotman.

At first, Trotman says the new antenna helped him bag what they refer to as "Gud DX."

"For a few days, it was fine," said Trotman. "Then on about the fourth day I picked up an obnoxious 40 dB over S9 signal on 40 meters. It blew my headphones off my dang head!"

In an effort to locate the source, Trotman began circling his house with a small AM radio trying to "sniff out" the RFI source. He found it—in his doorbell, which he promptly ripped off the exterior wall.

"But the next day it was back—this time on 15 meters—and way worse and even louder!" said Trotman. He went on the hunt again, this time taking a sledgehammer to his new 55" plasma TV and literally punting a paper shredder into his back lot.

The noise didn't stop. Over the course of the next couple days, Trotman destroyed three desktop computers, six smoke detectors, 34 various CFL and LED light bulbs, two 30 amp switching power supplies, an electric fence around his neighbor's house, some 12v "wall wart" power supplies, his girlfriend's new iPhone and charger, his main bathroom toilet (he kind of got carried away on that one), and finished by using a quarter stick of dynamite to blow up the pump for his water well.

All said and done, Trotman has dismantled almost everything in his house that plugged into a wall or was powered by commercial mains. "The noise!" shrieked Trotman, "I just couldn't kill it!"

Trotman stated he is now formalizing plans to move into rural Franklin County on some land that has been in his family for years. "It's about 130 acres without a powerline in sight!" he says.

"I'm leaving it all behind! The hustle and bustle of this city life... and the noise. Oh lord, the noise!"

~ Ham Hijinks





## At The Last SARC Meeting

January Meeting Minutes

**Wednesday, April 11, 2018**

Location: Surrey PREOC  
Attendees: 31

President, Stan Williams VA7NF, welcomed everyone including several guests. There were no health and welfare items to report.

### **Financial Report**

Treasurer, Scott VE7HA, reviewed club bank accounts including recent expenses and noted that annual rent for the OTC has been paid for 2018. Scott noted that club name badges can now be ordered for \$10 each.

### **Membership**

John Brodie VA7XB stated that membership currently stands at 123.

### **Operations & Training Centre (OTC)**

John VA7XB reported that we're still waiting for 2 pieces of equipment to arrive, namely the Flex 6600 and the SPE Expert 1.5k Linear Amplifier, both expected within weeks. N1MM spots are now available thanks to Jeremy Morse VE7TMY who has set up a VPN tunnel. This will be useful for those contesting. A problem with CW transmissions on the IC-7610, has been noted, apparently related to the computer rather than to the radio or logging software. A work party will be scheduled shortly to get miscellaneous jobs completed including installation of coax stand-offs on the yellow tower. Discussion is taking place among the executive about how to establish another tower at the OTC. Dave Sinclair VA7DRS thanked John for setting up the IC-7610 station.

### **Field Day**

Sheldon Ward VA7XNL reported that the recent FD meeting last month had a smaller turnout than previous meeting. If people are interesting in participating in FD planning please contact Sheldon. FD will be at the same location as last year, i.e. Grandview Heights School Grounds. Date of next meeting is TBD.

Stan Williams: At FD, we are planning to run in semi-contest mode with 2 or 3 stations. Anyone that would like to practice before-hand on the IC-7610 can make arrangements with the Executive to open the OTC. There are very few contest opportunities between now and FD however 3 QSO Parties are on this weekend for anyone interested.

### **Surplus Equipment**

Sheldon Ward advised that he has been working on a surplus equipment disposal/sales policy, which will be described in the next Communicator. The plan is to have an online auction. Priority will be given to members of the club for the equipment.

### **Test Court Case**

Stan Williams is preparing a test court case for antennas in Strata in cooperation with RAC legal counsel. Anyone having strata issues please advise Stan.

### **Doors Open**

John Schouten VE7TI noted that on Saturday June 9th 2018 11am - 4pm SARC will be opening the OTC for visitors as part of Surrey Doors Open event. SARC's



involvement will be similar to the Jamboree on the Air (JOTA) last October. The plan is to have a variety of activities including Foxhunting. Volunteers are needed. More information will be found in the May Communicator.

John Schouten: JOTA is also being planned for October to be held at Camp McLean in Langley.

### **Ham Class**

Stan Williams: The Spring Ham Class has commenced with 13 students.

### **Foxhunt**

Anton James: The Foxhunt will be held on Saturday May 19th, 2018 at Crescent Park in South Surrey (the usual venue). To get there, turn south on 129th St off Crescent road. Participants should arrive close to 8:30 am for orientation. A dummy fox will be set up for practice and the start time will be staggered beginning at about 10:00 am. Volunteers are needed to help set-

up the foxes. The primary hunt will be on 80m foxes, but a 2 m hunt is also planned. A BBQ (\$10 per person) will follow the hunt. Participants do not need a license so bring any family/friends for a fun day in the park.

### **QSL Card Manager**

Heinz Buhrig VA7AQ noted that our Logbook of the World (LOTW) account expired and had to be renewed. The account is now good until Feb 2021.

### **Presentation**

The evening's presentation on amateur radio direction finding (ARDF aka "Foxhunting") was made by Amel Krdzalic VA7KBA and Les Tocko VA7OM.

See details below and next page.

The meeting was adjourned at approx. 2045 hrs.

~ Jeremy VE7TMY

## ***Presentation on Foxhunting—SARC April 2018 Meeting***

The evening's presentation on amateur radio direction finding (ARDF aka "Foxhunting") was made by Amel Krdzalic VA7KBA and Les Tocko VA7OM.

Amel and Les described the world-wide popularity of ARDF, introduced a new 80m receiver which will be available soon once sufficient orders have been received and gave some pointers regarding techniques for finding foxes. Thanks to Amel and Les for their enthusiastic promotion of ARDF in general and their help with SARC's event.

The North Shore Club has a Foxhunt scheduled May 5th from 8am to 3pm in Princess Park Vancouver. This could be a great warm up for the SARC Foxhunt May 29th.

<https://ardf.whyjustrun.ca/events/view/3267>

See page 16 for further information about the radio sport of Foxhunting.



May 2018



## Radio Direction Finding

John Schouten VE7TI

***SARC Foxhunt Saturday, May 19***



Les VA7OM and Amel VA7KBA always put on an interesting presentation. No less so for this past SARC General meeting where they presented a preview of their new 80m fox receiver, currently undergoing final testing. The trend has been moving toward 80m equipment for Foxhunting due to the limitations and frustrations of 2m gear, including multipath, refractions and limitations with antennas, attenuators and signal indications. The prototype 80 receiver fits easily in the hand, is attractive and offers technical benefits such as an effective sense antenna, and a sharp null for improved directivity. An accompanying 80m fox transmitter will also be available in 3 variations based on output power and at a very competitive price. The new receiver should be available shortly and orders are now being taken.

SARC has hosted a Foxhunt for a number of years and popularity has increased, particularly on dry event days. Our next event is on Saturday, May 19th starting at 10am at Crescent Park in South Surrey—see the event poster on page 19.

For novices, it may be interesting to review some of the details of this radio sport.

### Types of Transmitter Hunts

Transmitter hunting is pursued in several different popular formats. Many transmitter hunts are organized by local radio clubs, and may be conducted in conjunction with other events, such as a radio enthusiast convention or club meeting. Before each hunt, participants are informed of the frequency or frequencies on

which the transmitters will be operating, and a set of boundaries that define a search area in which the transmitters will be located. Transmitter hunters use radio direction finding techniques to determine the likely direction and distance to the hidden transmitter from several different locations, and then triangulate the probable location of the transmitter. Some hunts may include limits on the amount of time allowed to find a transmitter. Although many transmitter hunts are conducted just for the fun of the activity, some more competitive hunts will recognize winners in publications and offer awards, such as medals or trophies.

### Mobile Transmitter Hunts

Mobile transmitter hunts are organized events where participants travel exclusively or primarily in motor vehicles. Most mobile transmitter hunts use VHF transmitters and receivers. Some participants use radio direction finding equipment and antennas mounted on a vehicle, whereas others use antennas that are temporarily deployed in an open window or an opening in the vehicle roof that can be easily rotated by hand while the vehicle is in motion. Other participants employ handheld antennas and radios that can only be used when the vehicle is stationary. Some mobile transmitter hunts require participants to leave their vehicles and proceed on foot to reach the actual location of the radio transmitter. The winner of a mobile transmitter hunt can be either the first vehicle to arrive at the hidden transmitter, or the vehicle that travels the shortest overall distance to locate the hidden transmitter. Mobile transmitter hunts are more popular in North America than other parts of the world.

### Pedestrian Transmitter Hunts

A regulated sport form of transmitter hunting on foot is called Amateur Radio Direction Finding,

known worldwide by its acronym, ARDF. It is an amateur sport that combines the skills of orienteering and radio direction finding. ARDF is a timed race in which individual competitors use a topographic map and a magnetic compass to navigate through diverse, wooded terrain while searching for hidden radio transmitters. ARDF is the most popular form of transmitter hunting outside North America.

### Fixed Location Transmitter Hunts

Some transmitter hunts feature a "mail-in" competition, in which teams in fixed locations work together to locate hidden transmitters, then secretly give the coordinates to the organizers without actually traveling to the transmitter location. The team which provides the closest coordinates wins, thus a team which believes that the transmitter is in the northwest parking lot at 2nd and Main (if it actually is there) will beat a team which says that the location is 2nd and Main. This type of hunt enables participation by contestants who are unable to travel, such as shut-ins, school groups, etc., and requires a greater level of skill and coordination.

### Equipment

Directional antennas are popular choices for transmitter hunting. A directional antenna is more sensitive to received signals in some directions than others. When a directional antenna is rotated, a received signal will either increase or decrease in signal strength, information from which a skilled hunter can determine the likely direction to the transmitter. The most popular designs for mobile transmitter hunts are quad antennas with three to five elements. Special design considerations include adequate strength to withstand the wind at highway vehicle speeds and ease of repair after collisions with overhead tree branches. In mobile transmitter hunts, directional antennas are often turned by hand while the vehicle is in motion.

Some radio direction finding equipment popular with mobile transmitter hunters operates on the time difference of arrival principal. Two identical antennas are mounted a precise distance apart from one another. Specialty electronics compare the phase of the signal received on each antenna and determine whether the signal is coming from a

*A radio direction finding truck used by the British Post Office in 1927 to find illegal radio transmissions. The source says that in addition to finding unlicensed radio transmitters operated by radio amateurs who neglected to get a license, it was also used in London to track down "bloopers" - regenerative radio receivers that produced interfering radio signals. The regenerative radio was one of the most popular types of radio during the 20s. However it used a vacuum tube with positive feedback that operated very close to its oscillation point, so when improperly adjusted it could radiate a radio signal that could produce shrieks and howls in nearby receivers. The interference problem got so bad that the British Post Office, which regulates radio communication in Britain, prohibited improperly radiating radio sets, and used this lorry to track them down. The back of the lorry contained a sensitive 3 tube radio receiver attached to the loop antenna on the roof, which could be rotated by a wheel in the lorry. The loop antenna is only sensitive to radio signals in the direction of the plane of the loop, so by rotating the antenna until the signal is strongest the direction of the interference could be determined. Thus with a crew of two, a driver and an operator for the radio direction finder, the lorry could track down the house the interference was coming from. They would give the owner a warning and information on how to prevent the problem. In Britain, radio receivers had to be licensed by the Post Office, so if he failed to fix the problem, his receiver license could be revoked, so he could not operate the receiver. The US eventually also prohibited receivers from radiating interference.*



*(Continued on page 18)*



May 2018

direction closer to one antenna or the other. This information is commonly displayed with LEDs on a display. These devices are popular for mobile transmitter hunts where participants have to exit their vehicles and proceed to the transmitter location on foot.

Some mobile transmitter hunters use equipment based on exploiting the principle of Doppler shift. At least four antennas are mounted in a precise geometric pattern, often on the roof of a vehicle. Specialty electronics computes the amount of Doppler shift present in the received signals and determines a probable direction from which the signal originates. The direction is

commonly displayed using LEDs oriented in a circle or a straight line. Advanced units can use a compass or GPS receiver to compute a direction relative to the instant motion of the vehicle.

Attenuators are used by transmitter hunters to reduce the received signal strength of a transmitter. Attenuators are most often used when approaching the near vicinity of a transmitter, in order to keep the received signal strength within a usable range.

So, hopefully we have piqued your interest. Some 'loaners' will be available to try. Hope to see you on the 19th!



**SEAPAC®**

"The Northwest's Largest Ham Convention"

**June 1, 2, & 3, 2018**

The Northwest: Where Ham Radio is Growing

Host of the  
ARRL Northwestern Division  
Convention

[www.seapac.org](http://www.seapac.org)

Seaside Convention Center  
415 First Avenue, Seaside, Oregon



## SURREY AMATEUR RADIO CLUB 2018 RDF Foxhunt

**Saturday May 19, 2018 at  
Crescent Park, South Surrey**

**Pre-Hunt Coaching, Registration & Instructions 0900 - 1000  
Foxhunt commences at 1000 with barbeque at 1230**

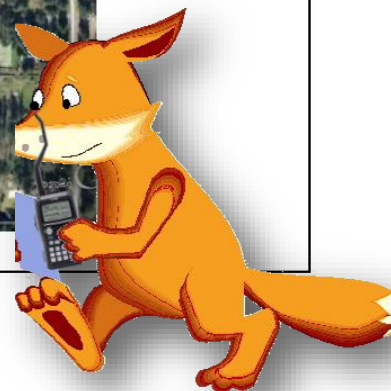
In contrast to previous years, this is primarily an 80 m foxhunt, although a secondary 2 m hunt is planned concurrently. So if you have equipment for both, bring it along. If you are a beginner or don't have a radio, then come anyhow – you can be part of a more experienced team or we will have equipment that you can use.

**Talk-in 147.360+ (110.9 tone)**

**FOXHUNT – NO CHARGE;  
BARBEQUE \$10**

All are welcome, but we ask that you RSVP Anton James [jamesadf77@gmail.com](mailto:jamesadf77@gmail.com) and indicate if you plan to attend the foxhunt or BBQ or both

To get there, take Crescent Rd. west from King George Blvd near Hwy 99,  
& turn off at 129<sup>th</sup> St. to parking & assembly area





May 2018



One of our more popular past covers, this one from May 2013 featuring the SARC Foxhunt and several articles on the subject. Read it at <https://tinyurl.com/SARC13-05>





Notice Of  
**ANNUAL GENERAL MEETING**  
Of The  
**SURREY AMATEUR RADIO CLUB**

June 13, 2018 at 7PM  
Emergency Management BC Offices  
14292 Green Timbers Way, Surrey, BC

**Agenda**

1. Welcome, call to order and confirmation of quorum
2. Approval of the agenda
3. Approval of 2017 AGM Minutes
4. Presentation and approval of annual financial statements
5. Announcements
6. Committee Reports
7. New and other business
8. Election of Directors
9. Adjournment

**Call For Nominations:**

Members elect up to 4 Directors annually for a two year term. Directors, in caucus, appoint the Officers (President, Vice-President, Secretary and Treasurer).

Directors whose 2-year terms expire are: Stan Williams, Jeremy Morse, Bill Gipps, and Sheldon Ward. Nominations are currently being sought and will also be taken from the floor.

**Only members in good standing may vote at the AGM**  
**This requires that annual dues for 2018-2019 be paid prior to or at this meeting**

May 2018

## Club Station News

John Brodie VA7XB

### CW Issues With N1MM And Our IC-7610



A screen capture obtained when sending the word "TEST" (- · · · -) at various speeds from 20 to 40 wpm. CW rise time was set at 6 ms

*CW on the IC-7610 using N1MM+ Logger - Another Opportunity to Learn*

I often have said that one way to become familiar with a new device is to

experience the frustrations of making it work with the software you intend to utilize during actual operation. Do this long before the contest!

The IC-7610 has a very useful feature for evaluating audio quality of received and sent signals, which it does by displaying an audio scope in a separate window and allowing capture of the screen image on an SD or thumb drive. We recently made use of it when trying to diagnose a problem with CW auto-sent from N1MM+ Logger. Once set up, the screen capture is triggered by momentarily pressing the power on/off button. I'm told that the IC-7300 has a similar feature.

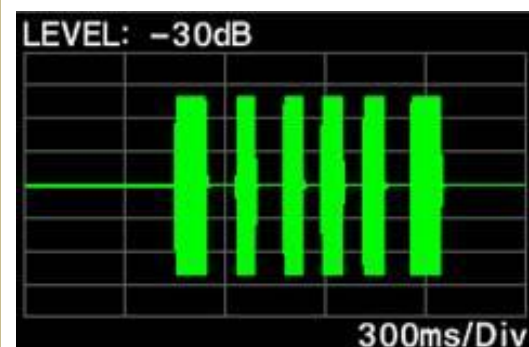
Our radio setup is simple: it consists of the IC-7610 connected by way of a single USB cable to a Windows 10 computer running N1MM+ Logger. The USB connection provides 2 virtual com ports for radio control, CW and digital modes. Com port assignment and other settings adhere to K3CT's prescription found at: [n1mm.hamdocs.com/tiki-download\\_file.php?fileId=4264](http://n1mm.hamdocs.com/tiki-download_file.php?fileId=4264)

Here is our problem: When auto-sending CW from N1MM+ Logger at speeds over 24 wpm, the ratio of dah length to dit length is incorrect, resulting in a poor quality of CW. The higher the speed, the worse the CW. More specifically, poor CW occurs only when sending macros either with the function keys or from the keyboard using ctrl-k. At 24 wpm or below, the quality of auto-sent CW is acceptable, as is CW at any speed sent manually with the paddle or from memories in the 7610.

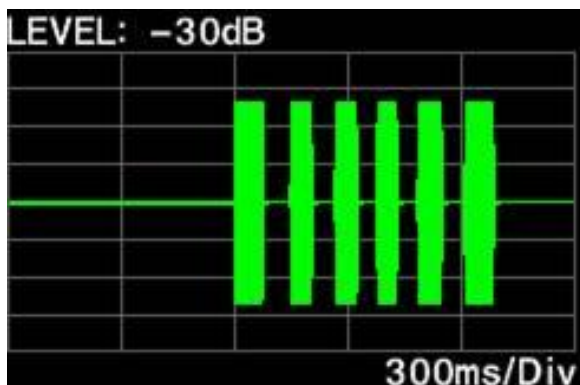
20 WPM



30 WPM

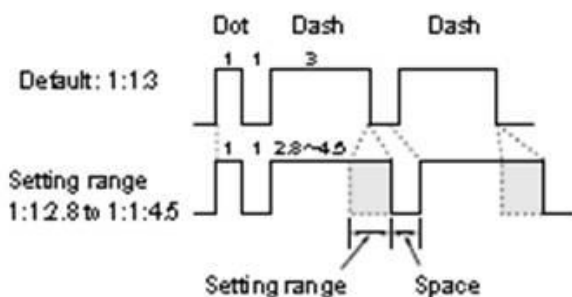


40 WPM



These figures show that as the CW speed increases, the dahs are barely longer than the dits, and the space between characters has also deteriorated.

As shown below for the letter “W” from the IC-7610 Advanced Manual, the correct ratio is: dit 1 unit: space 1 unit: dah 3 units (variable in the 7610 settings from 2.8 to 4.5). Clearly we have a problem.



While we're on the subject, the space between characters should be equal to the length of a dah, or 3 dits. The space between words is ideally twice (or more) the space between letters.

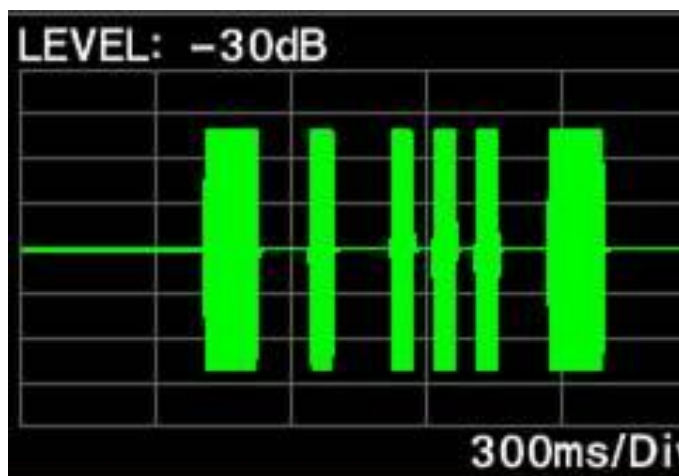
This anomaly was posted on the N1MM Reflector ([N1MMLoggerPlus@groups.io](mailto:N1MMLoggerPlus@groups.io)) to see if anyone had a solution. Various suggestions involving computer speed, RF interference, ground loops, USB cables and ports, firmware etc. were received and tested, but nothing changed. Even Tom N1MM and John K3CT, members of the N1MM software development team, weighed in. However, no one else reported a similar experience so ours appears to be unique.

Note: this is only a problem when using N1MM from the one computer currently connected (Windows 10 64 bit, Quad core processor 2.66 GHz with ample memory). The problem did not appear when tested on two other computers. What is it about this particular PC that is different from the others?

Clearly a practical solution would be to use a different computer with this radio; however, it would be instructive to know why this should be necessary. Any ideas out there?

Late breaking news: with the help of Jeremy VE7TMY and Sheldon VA7XNL, a new USB driver version (Silicon Labs UART v. 6.7.5.1893), not yet available through Windows, was installed. Now the CW is found to be acceptable at speeds up to about 32 WPM - a definite improvement; here's what the word “TEST” now looks like at 30 WPM - compare it with the earlier result.

Word “test” at 30 WPM using the latest USB driver



~ John VA7XB

*NOTE: “John VA7XB reports that he is still in consultation with the N1MM development team to diagnose and rectify the problem. For those who understand this stuff (not me, says John), diagnostics are focused on DTR latency times.” -Ed.*



May 2018



## Radio-Active

Robert Fishwick VA7FMR

### *Profiles of SARC Members*



**Dixie Mogg**  
**VA7DIX**

Dixie was born on the 5th of May, in the suburbs of Vancouver. B.C. Her father was a sports fisherman and made all his own equipment when he wasn't working in their garden or earning a living. He taught her all about tools and how to use them. Dixie lost her only brother, both parents and two husbands before the year 2000. Dixie knew well in advance that by the age of 18, she had to make her own way in life and so prepared to be the best secretary possible. Having succeeded in this endeavour, she enjoyed working for Engineers or Accountants for most of her work life.

She was always an athlete and specialized in running until she was kicked in the shin by a boot with an extra long ice skate blade. That ended her preparation for the Olympics. She met her first husband and moved to Kamloops with him for about four years. They returned to Vancouver when they decided to have children. When the third child was expected her husband left permanently, forcing Dixie to rely on Social Services for the next two years. She then found a part time job in a chicken hatchery and for three days a week took

the baby to work with her. Social services only allowed her to keep fifty dollars a week and the balance went to repay the support she had needed earlier.

When her son was old enough for day care, she returned to the business world. That was when Dixie's second husband came along and provided all the things she and her children had done without for so long. She continued to pay the mortgage and insurance on the house and her own vehicle but he provided gifts for every occasion; trailer holidays for family get aways; and best of all, took her dancing and dining every weekend. When the youngest reached his teens, her second husband took her on a three week holiday to Great Britain including a week in Paris. When he died unexpectedly, she worked for another ten years before retiring.

Volunteer work has kept Dixie from total retirement until this year. Now she is giving herself an opportunity to learn to paint and write, as well as making new friends on Amateur Radio. Dixie has been an active participant in SEPAR and often volunteers for local Amateur Radio events. Dixie has helped organize meals for Field Day participants and has ensured there were activities for visitors to the site. She also enjoys receiving messages and keeping daily records of check-ins on Rainbow Country Net. While listening to the enthusiastic camaraderie, she does not really feel included yet, but is working on it.

~ Robert VA7FMR







## Field Day 2018

Sheldon Ward VA7XNL

Well there are only about 7 weeks until 2018's biggest amateur radio event in North America. The 2018 Field Day starts on Saturday, June 23rd.

At our last FD meeting on April 22nd we had a number of discussions starting with antennas. As you know it doesn't matter what radios, tuners, computers, and other equipment you use, if your antennas are lacking your ability to make contacts will suffer. One of the antennas we hope to use is called a bobtail curtain antenna. This antenna will take a bit more work to put up than a normal dipole antenna but should provide much better signals.

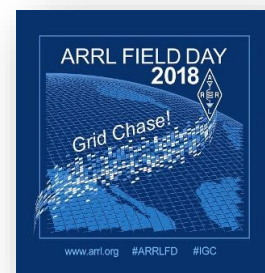
With the current solar activity this year's activity on the higher bands such as 15 and 10 metres will likely be down from previous years. As such, to continue to have three stations busy we are looking at the other end of the bands... 160 metres. In the last few years at least, SARC has not used the

160 metre band but this year we are hoping to have an antenna that will allow us to keep more radios on the air into the evening and night.

You may have heard of the new digital FT8 mode by Joe Taylor, K1JT. It is similar to JT65 but much faster (relatively). While not as fast as RTTY, etc. it does get the signals through with very low power requirements. There is hope that this new mode will continue to provide contacts and points when the bands start to close for other modes. It should be interesting to see how it handles a busy band.

That's all for now but we will discuss Field Day more at the next SARC General meeting on May 9th. Hope to see you there!

~ Sheldon VA7XNL  
2018 Field Day Chair



## SARC Membership Fees Are Due

Please note that our new fiscal year is rapidly approaching and your annual membership is due. Payment may be made at any monthly meeting, at the Saturday coffee meeting, by mail or via PayPal. Details on payment options are available at our website at:

<http://ve7sar.net/join.html>

Only members in good standing may vote at the June 13<sup>th</sup> AGM. This requires that annual dues for 2018-2019 be paid prior to or at the start of this meeting.





## The SEPAR Report

Roger Andrews VA7VH - SEPAR Coordinator

### *SEPAR Challenges*

I've had conversations with people responsible for the [E-Comm](#) system in BC, and their view is that the system is very resilient and mostly indestructible. I don't disagree that everything that they could think of adding to the system, to make it resilient, has been added. But I remain committed to the view that complex systems have vulnerabilities, and the more complex, the more vulnerabilities, the more redundancy has to be added, making it more complex... and so on.

Don't mistake my view as that of a doomsayer claiming that E-COMM will fail in a disaster. I'm pretty sure the E-COMM system itself, won't fail completely. Other systems that we rely on, probably will fail though. A few years back I bought a phone service for my home from one of the 2 major providers. The unit came with a battery backup in case of power outages. The service provider made big claims about how I would still have phone service during a power outage for at least a few, and up to several hours. It wasn't too long before we had a wind storm and the power went out. I'm not sure why that happens so often here, because we have underground wiring and sometimes only the power to our small area (all with underground wiring) goes out. But I digress! The power went out, and the phone went dead. The box they provided still had it's lights on, so the battery was fine. I complained to the provider. Of course I had to wait until the power was

restored to do so. I was told that the branch that had taken the power line out, must have taken the cable that provided phone service with it. Fair enough. I had to wait only a few months before another branch came down and knocked out our underground cabling again. The phone went out again. This time I noticed that it was interesting that the phone quit working at the exact moment the power went out and started working again when it came on. Eventually I managed to get the provider to admit that there was no backup power on the relay sites. So even though I had power to the system in my house, there was nothing for it to connect to. I eventually gave up on that phone system and so I couldn't say if they ever put in a backup system.

I said all that, to say that the service provider went out of their way to advertise a redundancy that didn't work, or even exist for that matter. Just because we are told everything is great, we won't know till the time comes if it will really work or not.

When the "Big One" hits what will the systems we rely on look like? Let's assume that E-COMM will be up and running, perfectly, without any disruptions whatsoever. It's the planners dream come true! A perfect system for a disaster that came through with flying colours. But will they even be able to get calls for help, when people like me can't get a phone to work in a power outage? Let's assume

that even if City and Provincial governments won't need our services, regular people probably will. So far history has shown that in every disaster land line switches and cell phone services become over-loaded to the point of failure. Failure in this case means that while they continue to work as designed, they become so overloaded, that only minimal calls make it through to their intended recipient. A fully functional emergency communications system needs calls from the public to work. Just because all the emergency services can talk to each other, doesn't mean the system is "working". The "system" includes those that are in need of help. As long as the telephone systems aren't as resilient as E-COMM is, then we will need emergency communicators like those in SEPAR.

### **SEPAR Annual Competition**

Every Year starting this April 1 2018, we start a competition that active SEPAR members can participate in. The most active member will win an MD390 DMR Radio package. You can checkout pictures of the radio and see the rules on <http://va7.ca/radio> (an interim website).

If you are not now a member, we'd love to have you on-board. Contact me at the link above.

### **Weekly Nets**

Every Tuesday evening at 1930 hrs (7:30pm PDT) we start a ½ hour NET on a local repeater provided by the Surrey Amateur Radio Club (SARC) on 147.360 MHz +600kHz and a tone of 110.9. There may be a simplex test or a test NTS message transmitted during the NET at the Net controllers discretion. This is an excellent opportunity to practice sending and receiving this form of messaging. Besides, it adds a little spice to the regular check-ins on the net. Please join us. NTS Radiograms can be found on the SEPAR website here, or, if you would like a fillable PDF that you can enter on your computer, you can get it from here.

Thursday nights at 19:30 hours, This Net has changed! We are no longer doing a regular 2 meter simplex Net on this night. Any plans for Thursday night will be announced on the Tuesday before. This night will now be used for optional tests. For example NTS Digital exchanges, 6 meter, 2 meter 60 cm and 220 Nets. If someone wants to do a particular net on a Thursday, then please announce it on the Tuesday before.

~ Roger VA7VH  
SEPAR Coordinator



*When the "Big One" hits what will the systems we rely on look like?*



**Surrey Emergency Program Amateur Radio**

May 2018

## The Richmond Emergency Communications Display

John Schouten VE7TI

The Richmond Amateur Radio Club hosted its second annual Swap Meet and Emergency Communications Display on Saturday, April 7th. Although the turn-out of visitors was good, there were few vendor tables. This year, more than 200 people came through the doors. VECTOR, SEPAR and 39 Service Battalion of the Canadian Armed Forces showcased their communication vehicles in the parking lot. In spite of the bad weather during that morning, the event attracted attendees from as far as Chilliwack and Kelowna.

The Surrey Emergency Program Amateur Radio brought their SEPAR trailer and demonstrated the use of the equipment inside. The military were out with their mobile communications post, and VECTOR, the Vancouver Emergency Community Telecommunications ORganization brought out their CERV—Communications Emergency Response Vehicle, a converted BC Transit bus.

I'll write a detailed story about the CERV in a future Communicator, but as one of VECTOR's founding members I was pleased to see it still in service. By way of a bit of history, the VECTOR Directors at the time discussed the pros and cons of a converted RV trailer vs a bus. The bus won out, primarily the result of the persuasion of the City Emergency Social Services (ESS) Director. The purchase was negotiated at \$1, just to make it







Left: SEPAR Coordinator Roger Andrews, VA7VH and the Surrey team display one of the program's three radio go-kits.

Right: SEPAR members on a tour of the VECTOR CERV.



legal, and not a bad price for a 'well-used' vehicle with over a million miles on the odometer. A BC Gaming grant was used to convert and outfit the bus with 5 workstations, a small kitchenette, toilet and a conference area in the back. The City of Vancouver did not have a command vehicle at the time and this was intended to be a mobile communications/command post, primarily for use by the Emergency Program and ESS. A side benefit of this arrangement was that the city agreed to store it at their works yard.

My driveway couldn't accommodate CERV but a VECTOR member, himself a bus driver offered to store it—temporarily. It spent almost a year in his driveway, blocking his garage, until his wife insisted it be moved. Many VECTOR members donated their spare time to this extensive project. Having just retired, and as the CERV Project coordinator, I personally spend over 6 months working on stripping, then outfitting the bus with flooring, a carpeted ceiling to minimize noise, lighting and custom cabinetry for workstations. The latter was especially challenging, considering a bus like this has few square corners. We did a lot of bargain hunting, did body work, sanding, installed waste and fresh water tanks, two air conditioners, lots of cabling and a power plant consisting of several dozen UPS batteries recycled from the Vancouver Police Department IT Section. It made its debut at VECTOR Field Day 2006. Seeing it again in Richmond certainly brought back a lot of memories.



May 2018



## Orca DX and Contest Club

2018 Pacific Northwest  
DX Convention

ORCA DX & Contest Club

Date: August 3-5, 2018

Place: Inn at the Quay,  
New Westminster, BC

I'd like to let you and your club members know about the PNW DX Convention coming up BC Day long weekend. Summer is always a busy time for people, so it's better to put this event on personal calendars sooner than later. The cost of the weekend event is very reasonable and includes a great dinner and interesting presentations. The venue is great. The content of presentations is always interesting. And a gathering like this is a great opportunity for eyeball contacts.

Some background for those who might not know about this convention. It's a traveling event, with hosting duties shared among DX/contesting clubs in the Pacific Northwest. This year will mark the 63rd running, and Orca DX and Contesting Club is the host.

Please visit the convention website at <http://pacificnwdxconvention.com> for event details.

Use this site to register and to get accommodation info as well. Note that if you go to the hotel site to make a reservation, you might see that there aren't any rooms available. But that's because a big block of rooms has been set aside for people attending the convention. Just mention to the reservations desk that you're attending the DX convention, and you should have no trouble getting a room.

If anyone has questions, email me. If I don't know the answer, I'll find someone who does.

~ Rebecca VA7BEC

### Northwest DX and Contest Clubs

[Spokane DX Association](#) | [Idaho DX Association](#)  
[Western Washington DX Club](#) | [Willamette Valley DX Club](#)  
[Central Oregon DX Club](#) | [British Columbia DX Club](#)  
[Orca DX and Contest Club](#)



## North Shore ARC

### NSARC Fox Hunt and Pot-luck Picnic

Two Fox Hunts in May: And no foxes will be harmed during these events!

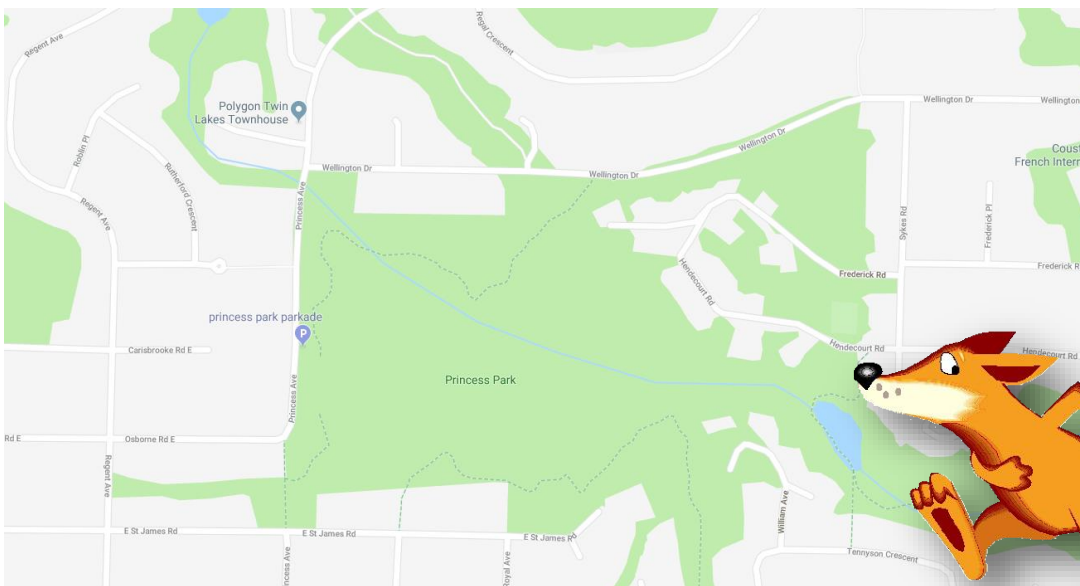
The NSARC Fox Hunt and pot-luck picnic is on May 5 in Princess Park, North Vancouver:

- you don't need a Ham license as you will be receiving only;
- you don't need to bring a receiver as some 80 m receivers will be available to borrow (bring your own earbuds if possible)!
- the picnic is open to anyone whether or not you are able to join in the foxhunt - come and meet friends and make new friends.
- there will be a briefing for newcomers at 08:00 hours to

familiarize with a receiver, signal transmitted, taking bearings and triangulation.

- meeting time for all including people who have receivers is at 09:30
- the ARDF hunt starts at 10:00 hours.
- the picnic follows the ARDF Fox Hunt. There are reserved benches in the covered picnic area for us.
- location below or see the on-line map at:  
<https://goo.gl/maps/CLBYq9QMsQt>

~ George Merchant VE7UQ



Amateur Radio Club  
North Shore



May 2018



## RAC News

### Revised Table of Frequency Allocations

#### *15KHz For The 6m Band*

Revised Canadian Table of Frequency Allocations now includes additional 15 kHz for 60m band frequencies.

In August 2017, the Department of Innovation, Science and Economic Development (ISED) issued "Proposed Revisions to the Canadian Table of Frequency Allocations". This is a 15kHz-wide allocation for the Amateur Service in the 60 meter band. The proposed revisions to the Table would retain the original five MHz spot frequencies with 100 watts of effective radiated power, but the new 15 kHz allocation to only 15 watts (eirp), the agreement at WRC-15 that accommodated concerns of a few countries over possible interference to their domestic communications. Decisions at World Radio Conferences require unanimous consent of all member nations.

Radio Amateurs of Canada noted in their response to the effects of radio interference in the United States. Further, the rationale for allocating the frequency of the WRC would have seriously limited this use. The Ottawa Valley Mobile Radio Club, the Marconi Radio Club of Newfoundland and several individual Radio Amateurs also recommended 100 watts. The new allocation will be more effective and manageable for domestic use. The responses can be read at: <https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf11346.html>

Revised Table of Frequency Allocations  
<http://www.ic.gc.ca/eic/site/smt->

[gst.nsf/eng/sf10759.html](https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10759.html) issued on 13 April 2018 ISED has addressed the concerns of the Canadian Amateur Radio community. The 5349.5 kHz - 5366.5 kHz (which overlaps one of the previous 60m spot frequencies) and the previously allocated spot frequencies (5332, 5348, 5373 and 5405 kHz). The maximum permissible radiated power of 100 watts PEP, 2.8 kHz transmission bandwidth and permitted modes of telephony, data, RTTY and CW. The Table notes that the Amateur 60m allocations are not affected by international frequencies. As in the previous allocation of the spot frequencies, the Table notes that the service may be required to cease operations. This is a standard condition of domestic allocations and has been noted previously by RAC.

Even though the Canadian Table of Frequency Allocations now identified this new 60 meter allocation for the Amateur Service, Canadian Amateurs must be granted authorization by ISED before using the new 15 kHz segment. Such authorization is normally effected via a revised issue of RBR-4 - Standards for the Operation of Radio Stations in the Amateur Radio Service (<https://www.ic.gc.ca/eic/site/smt-gst.nsf/eng/sf10650.html>). Radio Amateurs of Canada will be urging ISED to authorize the new 15 kHz segment as soon as possible.

Glenn MacDonell, VE3XRA  
RAC Chair and Chair  
[ve3xra@rac.ca](mailto:ve3xra@rac.ca)

#### *Durham Radio Closes Its Doors*

"We regret to inform you that Durham Radio Sales & Service Inc., after nearly 25 years in the industry - closed its doors forever at 3:00 PM on Saturday, April 14th. We would like to thank our dedicated staff, loyal customers and friends for your continued support and for many great years in this hobby.

Unfortunately, times have changed and it has become impossible to remain competitive in this industry without making drastic changes to our business model. We have decided that it would be better to close the business rather than change the products we carry and reduce customer service."



## The New Westminster Hyack International Parade

Saturday, May 26.

Operators assigned to the assembly area and parade officials will start communications at 08:00 and those assigned to points along the parade route will start a little later. The event starts at 10:30 with the Vancouver Police Motorcycle Drill Team and the parade follows. We are usually all done by around 13:00.

I am in need of about 25 operators. Assignments will include such things as assembly area, judging, shuttle buses, police, First Aid, with various Hyack and parade officials, P.A. announcer, dispersal etc.

The parade committee also counts on us for communication at many of the intersections along the

parade route. Radio operators assigned to these points may wish to have family members with them to enjoy the parade.

Please let me know whether you will be able to help. May 26 seems like a long ways off, but is just over 4 weeks away! I know how much the Hyack Association and the City of New Westminster appreciate our services.

**HELP PLEASE! - FORWARD THIS MESSAGE TO ANYONE YOU THINK MIGHT POSSIBLY BE INTERESTED IN JOINING US. ANNOUNCEMENTS ON NETS, CLUB MEETINGS, NEWSLETTERS, WEBSITES ETC. WOULD BE GREATLY APPRECIATED!**

As always, new hams are very welcome. No experience is necessary, we can certainly buddy up any brand new hams with an experienced operator. All that is required is a 2 metre handheld (and hopefully a spare battery!)

I will of course supply further details as the event draws closer. Thanks in advance for your help,

~ Ken Clarke VE7BC

[ve7bc@arrl.net](mailto:ve7bc@arrl.net)

telephone: 604-816-5775 (cell, texting is good)



*There's been some lively discussions and good attendance at recent Saturday gatherings. You're invited to join us for this informal weekly coffee klatch.*



### Kalmar Social Reminder

The Surrey weekly social gathering is on Saturday at the Kalmar Restaurant at 80th and King George Boulevard between 8 and 10:00 am. You don't have to be a SARC member to participate. Bring your significant other, bring your family, see old friends and have fun.

May 2018



## KB6NU's Column

Dan Romanchik, KB6NU

### ***"Alexa, help me with ham radio"***

*When he's not trying to figure out which way current flows, Dan blogs about amateur radio at [KB6NU.com](http://KB6NU.com), teaches ham radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him at [cwgeek@kb6nu.com](mailto:cwgeek@kb6nu.com).*

I have had an Amazon Alexa (<https://www.amazon.com/Amazon-Echo-And-Alexa-Devices/b?ie=UTF8&node=9818047011>) for nearly a year now. Mostly, I just use it to listen to internet radio stations or tell me a joke, but I think it has more potential than that. For example, I've written before about how I'd like to develop an Alexa skill to control my IC-7300 (<https://www.kb6nu.com/use-alexa-amateur-radio/>). I haven't gotten around to that yet, but, Joe, N3HEE, has just published an Alexa skill called Continuous Wave ([https://alexa.amazon.com/spa/index.html#skills/dp/B07C7HS47J/?ref=skill\\_dsk\\_skb\\_sr\\_0](https://alexa.amazon.com/spa/index.html#skills/dp/B07C7HS47J/?ref=skill_dsk_skb_sr_0)). It's designed to help you learn Morse Code.

To use this skill, you have to first enable it. Once enabled, say, "Alexa, open Continuous Wave." This opens the skill at the main menu. You can then say any of the following at any voice prompt...

- Learn
- Practice
- Alphabet
- Common words
- Random words
- Words
- Sentences
- Call signs
- Contest
- Quick Brown Fox
- QSO

- Help
- Stop - To end your session.

I've just played around with this app for a short time, but I've found it to be quite entertaining. It does, however, have one big drawback. You can't set the speed. It's currently limited to sending at 20 words per minute only.

Also, the learn function could use a little refining. When you give the command "learn," it asks you for a character, sends that character three times, and then asks you for another. If you could set the speed at which the skill sends characters, it could teach a character like the K7QO Code Course, first sending the character slowly, then ramping up the speed.

Overall, though, I think this is a great first shot at a usable Alexa skill for teaching Morse Code. I hope this is the first of many versions of this skill.

#### **Other ham radio skills**

While I was poking around on Amazon, I decided to see what other amateur radio skills might be available. Here are a few that I found:

- Ham Exam ([https://alexa.amazon.com/spa/index.html#skills/dp/B01N7NQ3JE/?ref=skill\\_dsk\\_skb\\_sr\\_6&qid=1524602919](https://alexa.amazon.com/spa/index.html#skills/dp/B01N7NQ3JE/?ref=skill_dsk_skb_sr_6&qid=1524602919)). Ask Alexa to ask you questions from the Technician Class question pool.
- Ham Lookup (<https://alexa.amazon.com/spa/index.html#skills/dp/B073YL88SL/?>



[ref=skill\\_dsk\\_pnpdp\\_dp\\_1](#)). Allows you to look up amateurs by call sign. Information is provided from the callbook.info database.

- Ham Radio Propagation Forecast ([https://alexa.amazon.com/spa/index.html#skills/dp/B073THV6ZP/?ref=skill\\_dsk\\_pnpdp\\_dp\\_0](https://alexa.amazon.com/spa/index.html#skills/dp/B073THV6ZP/?ref=skill_dsk_pnpdp_dp_0)). Reports the latest forecasts directly from HamQSL (run by NONBH).
- ARRL Audio News ([https://alexa.amazon.com/spa/index.html#skills/dp/B078Y7NGYT/?ref=skill\\_dsk\\_skb\\_sr\\_1&qid=1524750783](https://alexa.amazon.com/spa/index.html#skills/dp/B078Y7NGYT/?ref=skill_dsk_skb_sr_1&qid=1524750783)). Adds ARRL Audio News to your Alexa flash briefing.

### Building your own voice app

The Continuous Wave Alexa skill was developed using tools found at VoiceApps.Com. Two other websites—Pullstring (<https://pullstring.com>) and StoryLine (<https://getstoryline.com>)—also have tools to help you build voice apps. And, Amazon has an online tutorial that will teach you how to build an Alexa app. I'm just getting started with these tools, so I can't recommend one over the others, but they do look like they'll make developing voice apps easier.

Since I'm currently in the process of updating my No Nonsense Technician Class License Study Guide, it occurs to me that I should also develop an Alexa skill for drilling students on test questions. I guess you could call them audio flashcards. Stay tuned for that.

~ Dan KB6NU

*Reprinted with permission*

### Six things you might not know Amazon's Alexa can do for you

Alexa, Amazon's virtual assistant, comes loaded with a variety of features. But it's the "skills" that really allow you to customize your experience to your liking. Skills are the Echo's (and Dot's, Show's and Spot's) version of apps: Programs that, when enabled, provide some extra functionality. There are currently tens of thousands of skills available on Amazon's site, and more are added every day.

Some of these skills are specifically designed to interface with Alsmart-home products — i.e., thermostats, lights, remotes — while others take a stand-alone approach to voice control:

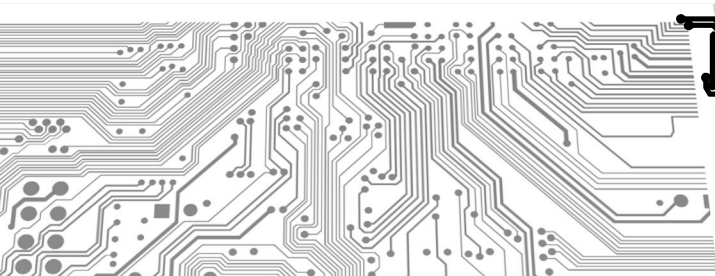
<https://www.youtube.com/watch?v=gGAtPcRtWd8>



The Radio Amateurs of Canada (RAC) magazine 'The Canadian Amateur' (TCA) March-April is now available to members. For membership information, please visit: [wp.rac.ca](http://wp.rac.ca)



May 2018

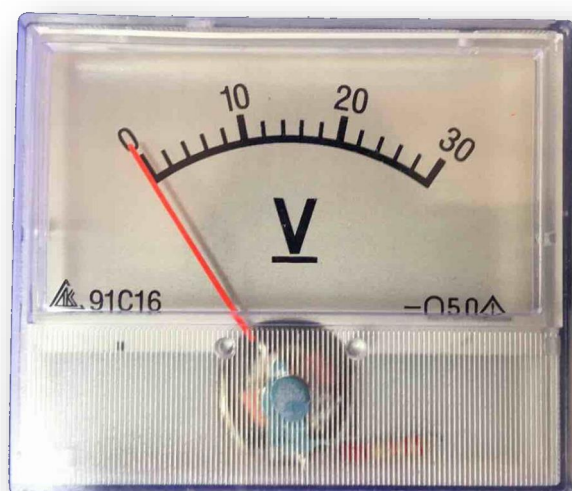


# TECH TOPICS

Daniel Romila VE7LCG

## A Simple Digital S-Meter

When building or modifying radio amateur equipment it is often useful to have an indication of the strength of a certain signal - generally referred as an S-meter in the case of receivers.



*A meter movement as described in the text can be purchased very inexpensively but can be difficult to mount on a panel*

The immediate solution for the hobbyist is to use an analog mechanical instrument. They are available in different sizes and sensitivities and they look nice on the panel. Such inexpensive plastic instruments can be bought for around \$2.00 CAD.

I selected one such instrument with more than sufficient sensitivity. It is easy

to add in series and in parallel resistors, in order to meet the exact necessity for that circuit sensitivity and range. 50 micro amps sensitivity instruments are available, for around \$5.00 CAD. They can be purchased already marked as voltmeters and are modified internally by the manufacturer/seller by adding a resistor in series with the ammeter movement.

The main problems with such instruments are their size and their mounting requirements on a panel. Looking at the back of such instruments [left], one can understand the effort required to cut the panel and mount the meter, an effort that will require more than a drill and easy to use small drill bits.



The digital solution was widely exploited in the disco music period, when many LEDs were lighting the life of listeners in the shape of VU-meters and all kind of fun panels.

I researched what kind of dedicated integrated circuits are available to buy now, in 2018. I had in mind:

- Price
- Range of power supply voltage - to work for sure at 12 V, but it would also be nice if they can work at 5 volts or even 3 Volts.
- Sensitivity - to be able to see some indication starting somewhere at 200 millivolts DC, or better
- A good range of values indicated, at least 5 LEDs but 10 LEDs would be better (if I do not need 10 I can always leave them disconnected).
- To be easy to use and reliable.

I selected the integrated circuit LM3914. It costs around \$.20 CAD. It can drive 10 LEDs, in bar or graph display. The power supply can be from 3 Volts to 25 Volts. It accepts input over-voltages plus/minus 35 Volts. It is good to know it cannot be easily damaged. In its simplest use it requires just 2 resistors, the 10 driven LEDs and a capacitor between the plus and the ground [see next page].

In my build, the power supply can range from 7 to 15 Volts without seeing changes in the LED light intensity. According to the IC datasheet the current is dictated by a resistor connected between pins 7

and 8. In my particular build pin 8 is at ground, so the 1K resistor dictates the intensity through the LEDs.

The first LED to switch ON is the LED connected to pin 1. This LED is the left most one.

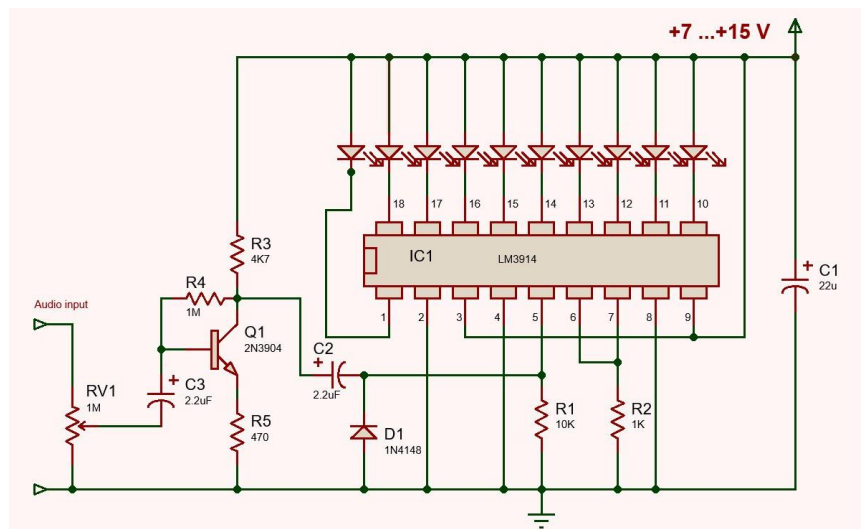
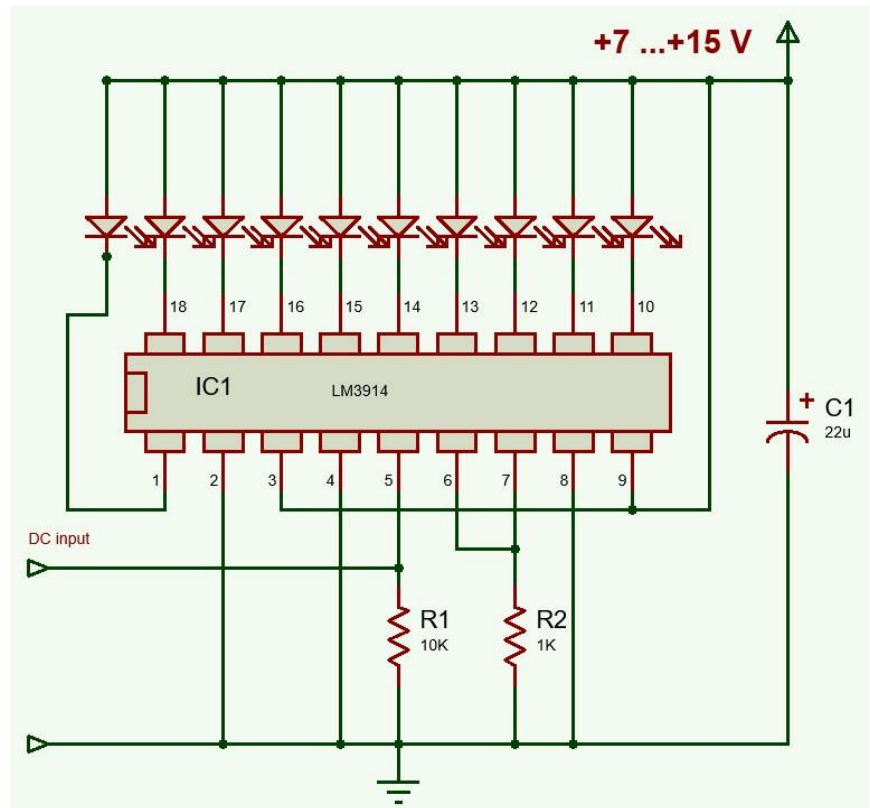
At 0.14 Volts DC only one LED is ON. At 0.26 Volts DC two LEDs are ON. All 10 LEDs are ON at 1.26 Volts DC input. The verified step between all LEDs is 0.12 Volts DC, with the lower threshold to activate the whole schematic, being 0.14 Volts DC, as already mentioned. This schematic already has good sensitivity and range to be connected as is directly to the AGC (automatic gain control) voltage of a receiver. My own build, presented in the picture on the right, chose the bar type of display. If you prefer a moving dot just leave pin 9 disconnected. Do not connect it anywhere, just let it in the air - this is exactly what the datasheet recommends and it works.

I also played with a version of this S-meter connected to the AC audio signal, as VU-meter [circuit lower right].

I made a rectifier with only one diode, D1, a 1N4148. Germanium diodes would improve a little the lower AC threshold, but the circuit is reliable with any kind of diodes, including rectifiers like the 1N4007. It was possible to use a single diode because internally the integrated circuit has at the input a 20K resistor, followed by a buffer protected by a diode against inverted voltages. This also means the circuit would have simply worked without any diode D1, which it actually does. I just felt like putting it in as an extra precaution, especially when testing and risking wrong connections.

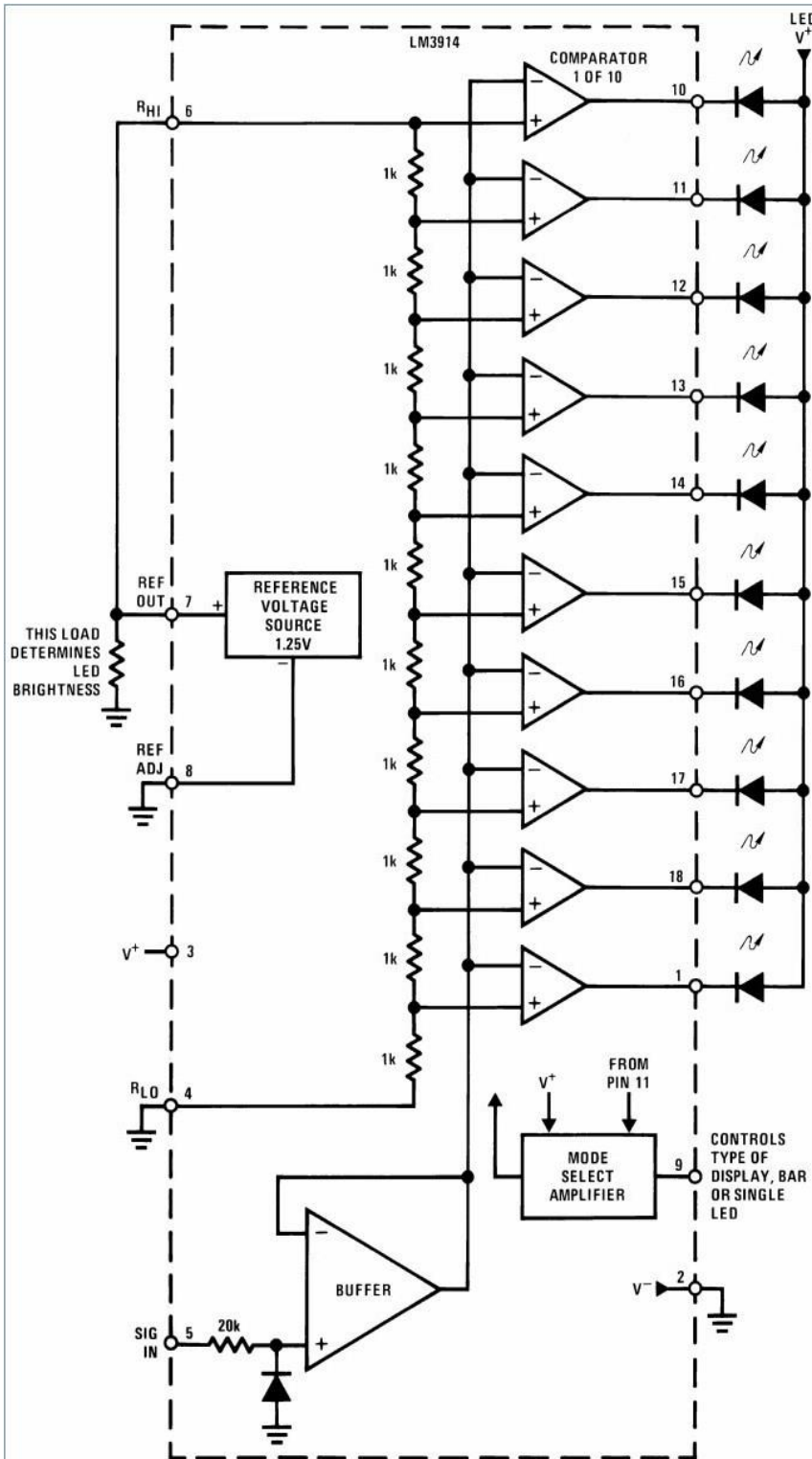
Q1 transistor is an NPN type. I have hundreds of 2N3904, so this is what I used. It was necessary to connect a 470 ohm resistor to its emitter to increase the AC voltage input range for indication and for stability. The collector current is somewhere between 0.9 and 1 mA.

The threshold voltage for switching ON the first LED (connected to pin 1 of the LM3914) is 20 mV AC amplitude. That is 14.14 mV AC RMS. For every 20 mV AC (amplitude) increase, another LED will switch ON, too.



At 180 mV AC amplitude input all LEDs are ON. That is 360 mV AC peak and is also 127.27 mV AC RMS, respectively. At those measurements the input potentiometer was let in a position so as not to influence the results (maximum resistance of 1M between input and ground).

May 2018



For those wanting to play with the LM3914 in electronics engineering computer simulation programs, I must say there will be a big disappointment. The free KiCAD does not have LM3914 in its library. NI Multisim, a very robust program costing thousand dollars is in the same situation. To the best of my knowledge, only Circuit Wizard and Proteus, both paid programs, have the LM3914 in their libraries. Even so, the drawing on the schematic will not look like my schematics presented here. I always try to use the real package for schematic representation of integrated circuits, with the pins in their actual position, to simplify constructing the circuit on a breadboard, and eventually soldering into a non-dedicated PCB. Expensive simulation programs like Proteus have a different representation than the natural one for the LM3914.

A simulation of the LM3914 (not done by me) in Proteus can be seen at:

<https://www.youtube.com/watch?v=v8zTtCgeG3Y>

A simulation of the LM3914 (not done by me) in Circuit Wizard can be seen at:

<https://www.youtube.com/watch?v=7CWhlMjHqHs>

Most probably my schematics and similar can already be found on the Internet, together with other variants. I also found on the Internet some incorrect versions. The schematics presented here work and were tested. Remember the first LED to light ON is connected at pin 1 of LM3914.

LM3914 had linear steps regarding the number of LEDs to switch ON depending on the input. LM3915 and LM3916 have a logarithmic characteristics. They have all the same pinout and all of them can be simulated in the computer program Proteus (their models are in the built in SPICE library).

~ Daniel Romila VE7LGG



## The 2018 State Of The Hobby

As a follow-up to Stan VA7NF's State of Amateur Radio comments in The Communicator this past winter, Dustin Thomas N8RMA has published the results of his poll on "The 2018 State Of The Hobby."

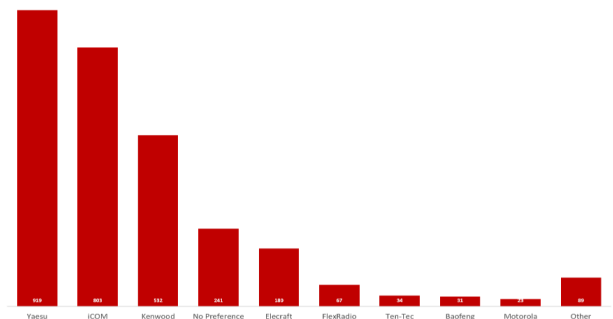
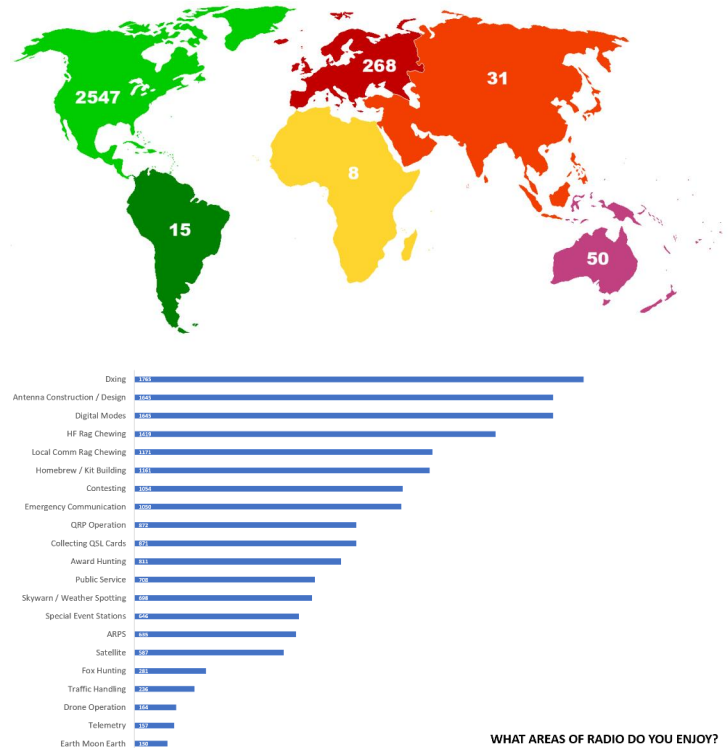
This survey started out in 2017 as simple curiosity. While browsing the Amateur Radio subreddit he began to notice several survey posts for highly specific topics. Dustin completed those surveys yet often found himself wondering what the result was. He then decided to host his own survey, to collect the opinions from the community on topics that he cared about, over as many years as possible. His goal was to make those results widely available for the entire community - and perhaps encourage operators to make changes in issues areas or continue doing what seems to be working! If these results bring even small changes, it was worth it.

2018 Survey Results: <https://sway.com/caKEAfI0sXg0RwcZ>

2017 Survey Results: <https://sway.com/dBedey0zHZEjk0Xt>

The survey provides a great many insights into our hobby, the current trends, age classes of participants, favourite modes etc. For example, in the last 12 months, 44% of responding operators engaged in some kind of public service. Dustin comments that: "This might not be true elsewhere but in my area opportunities to engage in service seem to be declining. This could be due to competing technologies or to lack of promotion. If you are aware of an event that could benefit from skilled communications, I encourage you to reach out to the organizers and offer your services."

Dustin provides some statistics of equipment suppliers as well. Preferred radio manufacturers saw a nice variety of companies, but not surprisingly the big 3 remained on top. Overall, Yaesu seems to be the most popular, followed by iCOM and then Kenwood. Other names to break in to the chart were Elecraft, FlexRadio, Ten-Tec, Baofeng and Motorola. It also appears a large group of respondents have no preference. Interestingly, regardless of reported household income, Yaesu remains solidly in the top spot. The data suggests that reported household income had little to no bearing on brand preference. This can either mean all the brands are too expensive or that they have offerings in multiple price-price points. Many respondents indicated brand preference had less to do with cost and more to do with feature sets. Operators in Africa and Asia tend to prefer the Kenwood brand and in Australia / Oceania they prefer iCOM. Dustin's confidence in this data is low however, considering he had a very limited amount of response data from those regions. While it may be a good sample, hopefully next year he can increase responses from those regions and build the confidence here.



In the US, those who are Amateur Extra class have a mild preference for iCOM (29.12%) over Yaesu (28.59%), however only slightly. Technicians clearly favour Yaesu, with a resounding 44.97% favouring big orange over Kenwood (19.58%) and iCOM (15.87%).

This might be due to a marketing strategy by Yaesu or perhaps related to the promotion of C4FM repeaters for clubs. This mode was listed as the second most reported for new area repeaters, and technicians might be jumping on the fusion wagon with their gear selection.

~

May 2018



Daniel Romila VE7LCC

## ***Modifying A Switching Power Supply Into A Variable Power Supply***



I was faced with a problem that many radio amateurs have: getting a power supply capable enough to fulfill my daily needs and also for the foreseeable future. I decided that switching technology is the way to go, and that 12 Volts is my main voltage need. Regarding the power rating, I was limited by my budget, because the more Amps a power supply can give, the more money I would have to spend. I established 42 Amps would be enough, that meaning 500 Watts.

The above moment of decision was in 2016. So, now - in 2018 - I can tell you about the results of my selection of power supply.

Whenever I was looking at eBay, Amazon and the Chinese websites ([aliexpress.com](http://aliexpress.com), [banggood.com](http://banggood.com), [gearbest.com](http://gearbest.com), etc) I was searching for: 12V 42A. No blanks between the figures and the letters V and A symbols, and I always got and I still get pages with pictures like these on the left and below.

Sometimes they are specified as being power supplies dedicated to LED strips. Other times they are named as power supplies for electronics hobbyists and other times they are directly named power supplies for radio equipment.



The size of such a brick, at 12V and 42A is 115 x 215 x 46 (mm). The price in 2018 is consistently around \$38 CAD—\$29 USD (shipping and taxes included).

There is a trimmer resistor next to a green LED which allows the adjustment of the output voltage between 9V and 14V. That was already an awesome power supply for my needs, but could be even better with a potentiometer and a digital voltmeter in it.

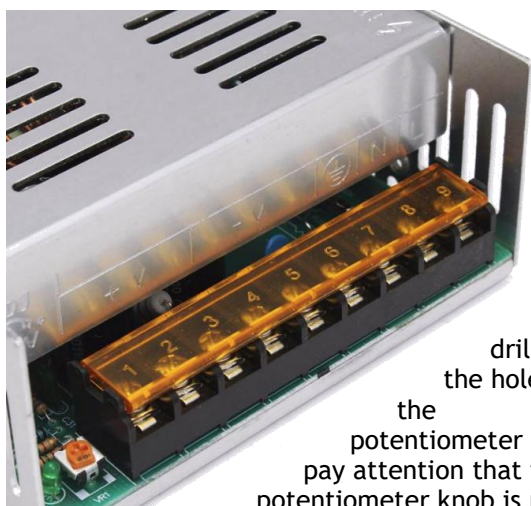
I was inspired by a webpage of Dr. Lindsay Robert Wilson (Ph.D), who disassembled a similar 12V 33A brick power supply and completely reverse engineered the schematic, measuring components and he drew graphs in 2015. A pretty impressive piece of work:

[http://www.imajeenyus.com/electronics/20151028\\_smpps\\_variable\\_voltage/index.shtml](http://www.imajeenyus.com/electronics/20151028_smpps_variable_voltage/index.shtml)

Dr. Wilson modified the schematic in the voltage adjustment stage and added a 2 wire digital voltmeter into the brick.



My depth of work was smaller than what Dr. Wilson did. I simply took the screws out from the Aluminum lid, took out the PCB and replaced the trimmer resistor (2K) with a 10K linear potentiometer, which I screwed into the side panel. That extends the voltage range from the original 9 - 14 Volts to 4.5 - 15 Volt. Here are the pictures before and after.



When drilling the hole for the potentiometer hole pay attention that the potentiometer knob is not in the way of the orange plastic lid covering the contacts.

I also took the power supply cord through the back Aluminum panel, where I drilled a hole. All 3 wires, including GND have to be connected, and I connected them to their respective places and fastened them, routing the wires from inside the case instead of outside. I do not want to move them again soon.



On the top Aluminum cover I used cutting pliers to open a ventilation window above the input/output connections, to the left of the potentiometer in the photo above, into two. I connected a 2 wire digital voltmeter with 3 digits and fixed it on the lid. There is nothing underneath, so it is safe.

The 2 wire digital voltmeter can be bought from eBay, Amazon, and so on. Today, at the end of March 2018 it is exactly \$1 CAD (including shipping and taxes) at [aliexpress.com](https://www.aliexpress.com). I remember I bought it cheaper than that, at around half price in 2016. The digital voltmeter has the 2 wires soldered into the power supply board, at its output.



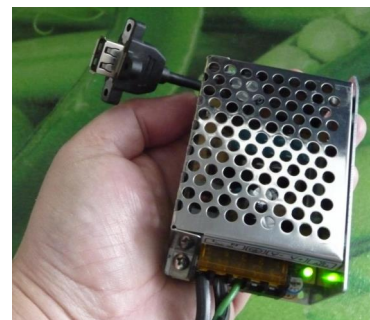
I successfully used this power supply for my Kenwood 7950 HF transceiver. I had very short power wires, so I placed the power supply on top of the transceiver, on its speaker, because I use headphones.

There was no noise generated. I also used it for various audio experiments with operational amplifiers installed on a breadboard at around 30 cm from the switching power supply. The power supply does have to be connected with a 3 wire power cord into the 120 volt wall plug. Remember to always have the ground wire connected.

I was not able to heat up this power supply. I connected 12 Volt light bulbs, with a maximum power of a little less than 150 Watts, and the fan started to rotate automatically, but it is silent.

I recently continued playing with switching power supplies by making a 5V 3A charger shown below right. But that's an article for another day.

~ Daniel Romila VE7LCC





May 2018



## Surrey Doors Open

A June 9th Special Event at the OTC



We have applied for, and been accepted as a destination for the **Surrey Doors Open** program scheduled for Saturday, June 9th from 11am to 4pm at the OTC.

Surrey Doors Open is a one day event for organizations to invite community members to “discover the story behind every door”.

This free event

offers fun activities for all ages, behind-the-scenes guided tours, entertainment, hop-on-hop-off transportation and more! Almost 5,000 visitors attended last year.

If you have any questions, or require further information about this community event, please email [doorsopen@surrey.ca](mailto:doorsopen@surrey.ca).

John VE7TI is coordinating this event on behalf of SARC and SEPAR. As in previous community demonstrations of Amateur Radio, most recently the Scout's JOTA event, we intend to offer several stations geared to all ages. This will include Morse Code practise, Introduction to radio, HF contacts, contacts worldwide using Echolink and/or IRLP, hopefully a favourable satellite pass and, weather permitting, a fox hunt hidden transmitter activity.

A number of SARC and SEPAR volunteers are needed as presenters, guides and operators. If you are available, please contact John VE7TI at [communicator@ve7sar.net](mailto:communicator@ve7sar.net).



*Our Spring Basic Licensing class is well underway. We have folks from all walks of life, some off-roaders, some interested in emergency preparedness and some looking to join the hobby for pleasure.*

## Wire Snippets

### Movie features ham radio

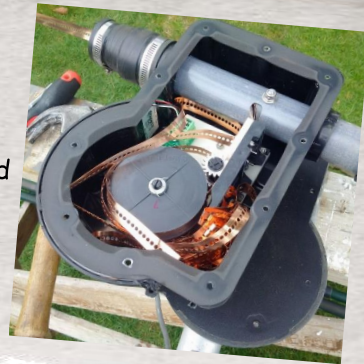
The ARRL report the movie 'A Quiet Place', starring Emily Blunt and John Krasinski, features Amateur Radio. The New York Times describes it as "A welcome alternative to the mind-shredding din of virtually any modern action movie, 'A Quiet Place' is an old-fashioned creature feature with a single, simple hook: The creatures are blind, hungry and navigate by sound." Sounds like me when I'm looking for a midnight snack!

### Attracting More Women to Amateur Radio

#### Hackers can hijack emergency alert sirens with a Baofeng and laptop

Emergency alert systems manufactured by Acoustic Technology Inc. can be hijacked and made to play any audio thanks to a vulnerability dubbed SirenJack.

His HF Stepp-IR antenna wasn't working so John VA7XB took apart one of the element housings. Quite a surprise! The copper tape that changes element length to tune has become completely wrapped up inside. Parts have been ordered and John should be back on HF soon.



### Portable Off Grid Power for Amateur Field Communications

<https://goo.gl/soaMsz>

### Azimuthal map Azimuthal map with DX spot reporting.

May 2018

## SARC CLUB EXECUTIVE 2017-2018

### PRESIDENT

Stan Williams VA7NF  
[president @ ve7sar.net](mailto:president@ve7sar.net)

### VICE PRESIDENT

John Brodie VA7XB  
[vicepresident @ ve7sar.net](mailto:vicepresident@ve7sar.net)

### SECRETARY

Jeremy Morse VE7TMY  
[secretary @ ve7sar.net](mailto:secretary@ve7sar.net)

### TREASURER

Scott Hawrelak VE7HA  
[treasurer @ ve7sar.net](mailto:treasurer@ve7sar.net)

### DIRECTORS

John Schouten VE7TI  
(Communicator Editor  
& SEPAR Liaison)  
[communicator @ ve7sar.net](mailto:communicator@ve7sar.net)

Sheldon Ward VA7XNL  
(Repeater Manager)  
[repeater @ ve7sar.net](mailto:repeater@ve7sar.net)

Robert Fishwick VA7FMR  
(Net Manager)

Bill Gipps VE7XS

### MEMBERSHIP

John Brodie VA7XB  
[membership @ ve7sar.net](mailto:membership@ve7sar.net)

### QSL MANAGER

Heinz Buhrig VA7AQ  
15684 102 Avenue  
Surrey, BC V4N 2G4

### EMAIL ALL DIRECTORS

[directors @ ve7sar.net](mailto:directors@ve7sar.net)



John Schouten VE7TI

## *We're Alive... And Well!*

It's always satisfying to receive some positive feedback...

*"Over the past few years, I've made it habit of searching for Amateur Radio Club newsletters in order to get an idea how the Amateur Radio Community is faring in our often turbulent, uncertain world. My recent discovery of "The Communicator" from the Surrey Amateur Radio Club in Surrey, British Columbia, Canada has convinced me that amateur radio is doing well, despite naysayers.*

*Like our own "Big Island Amateur Radio Club Newsletter" edited by Leigh Critchlow, this slick publication is filled with local news, technical articles, and tips on station improvement.*

*The October 2017 issue of "The Communicator" contains articles suitable for both beginners and veteran operators. Particularly interesting is a look at the life and accomplishments of Nikola Tesla. If you have some time, please dig into this issue-you won't be disappointed."*

I spend 10-20 hours putting together the average issue of The Communicator. Part of that process involves a lot of research to find interesting and current articles, news that has an impact on our local Amateur community and tidbits to fill

some of the blank space when a story doesn't fill a full page. Part of that research involves reading other club newsletters. I can tell you that, without a doubt, the newsletter of our format is disappearing rapidly. Most clubs now have an on-line presence, usually a webpage, a blog, FaceBook, Twitter or a combination of the above. What is also surprising is that some clubs have no public presence. I have looked for news about some of our local clubs but have found very little. Hopefully they publish something internally for their members because I don't know how a club can thrive without an exchange of information.

It benefits our entire Amateur Radio community, local, national and international if we share information, events and experiences. The feedback that I receive, including the comments above, have me convinced that there is an interested audience out there and that my time on this publication is worthwhile.

If you are involved in a club, please make an effort to share what is happening in your organization, the entire Amateur community will be thankful... even if they don't provide feedback.

~ 73 until the next issue, John VE7TI





## It's May

The next Surrey Amateur Radio Club general meeting is on Wednesday, May 9. This will be our annual Field Day planning meeting. Field Day is probably our most demanding event each year and requires a large volunteer effort. Please attend the meeting to find out how you can help.

### Down The Log...

#### SARC Monthly Meetings

2<sup>nd</sup> Wed. (Sept-Jun)  
1900 hr at the PREOC  
Emergency Mgmt BC  
14292 Green Timbers  
Way, Surrey, BC

#### Weekly Club Breakfast

Saturday between 0800  
and 1000 hrs at the  
Kalmar Family Restaurant  
8076 King George Blvd.  
Surrey

#### SARC Net

Tuesday at 2000 hr local  
on 147.360 MHz (+)  
Tone=110.9

#### SEPARS Net

Tuesday at 1930 hr local  
on 147.360 MHz (+)  
Tone=110.9

#### VE7RSC Repeaters

2m: 147.360MHz+  
Tone= 110.9Hz  
IRLP node 1736  
Echolink node 496228

1.2m: 223.960 Mhz -1.6  
Tone=110.9

70cm: 443.775MHz+  
Tone= 110.9Hz  
IRLP node 1737

**SARC** hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, also accessible on IRLP node 1736 and Echolink node 496228.

On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 or IRLP Node 1737.

	SARC Net 20:00 Hrs
1 <sup>st</sup> Tuesday Standby	Drew VA7DRW Dixie VA7DIX
2 <sup>nd</sup> Tuesday Standby	Jinty VA7JMR Sheldon VA7XNL
3 <sup>rd</sup> Tuesday Standby	Rob VE7CZV Vacant
4 <sup>th</sup> Tuesday Standby	Kapila VE7KGK John VA7XB
5 <sup>th</sup> Tuesday Standby	Robert VA7FMR Vacant
Want a turn at Net Control? Contact the SARC Net Manager	



### We Have A SARC Patch!

These are suitable for sewing on a jacket, cap or your jammies, so you can proudly display your support for the club.

The price is \$4 each or three for \$10 and they can be picked up at a meeting or the weekly Koffee Klatch.

# Burnaby Radio Communications

**Michael J. Wong** VE7HMW  
President/Owner

4257 Hastings Street  
Burnaby, B.C. V5C 2J5  
Phone 604-298-5444  
Fax 604-298-5455

Commercial / Amateur Radio

Email: [sales@burnabyradio.com](mailto:sales@burnabyradio.com)  
web: [www.burnabyradio.com](http://www.burnabyradio.com)

*We thank our sponsors  
for their SARC support.  
Please support them.*

## COAX PUBLICATIONS INC STUDY GUIDES

### BASIC QUALIFICATION:

#### The Canadian Amateur Radio Basic Qualification Study Guide

- New 9th edition.
- Updated to the current (2014) Industry Canada exam bank.
- This book is the most widely used study guide in Canadian Amateur Radio classes.

\$44.95 + shipping and taxes

### ADVANCED QUALIFICATION:

#### The Canadian Amateur Radio Advanced Qualification Study Guide

- Updated to the current (2014) IC exam bank.
- Covers many topics in modern communications that are not in the IC Question Bank.
- We have included the small amount of additional material required to match the IC 2014 update in the online Student Success Pages.

\$44.95 + shipping and taxes

#### Canadian Amateur Radio Basic Qualification Study Guide



Includes Unlimited Access To Student Success Pages On Our Web Site  
Coax Publications Inc

#### Canadian Amateur Radio Advanced Qualification Study Guide



Includes Unlimited Access To Student Success Pages On Our Web Site  
Coax Publications Inc

### Basic, Advanced or Instructor:

**we have them all!**

*All of our Study Guides feature:*

- Unlimited Access to our acclaimed Student Success Pages on our web site.
- Strong Lie Flat Binding – the book will stay where you opened it when on a flat surface.
- Contextual material that goes far beyond the bare requirements of the IC examination.

Clubs: Note special low club prices for orders of 7 or more books!

Order From Our Web Site  
<http://www.coaxpublications.ca>

# FLEETWOOD

## DIGITAL PRODUCTS

Two Way Radios... For Less

<http://www.fleetwooddp.com/digital>

[radio@fleetwooddp.com](mailto:radio@fleetwooddp.com)



These folks did a great job on the hydraulics for our antenna trailer.

18549-97 Ave., Surrey, BC, V4N 3N9 604-882-9787

<http://www.htihydraulics.com/about-us.html>

# HYDRAULIC TECHNOLOGIES INC.